



FLIGHT

&
The AIRCRAFT
ENGINEER.



First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

No. 492. (No. 22, Vol. X.)

MAY 30, 1918.

Weekly, Price 6d.
Post Free, 7d.

Flight.

and The Aircraft Engineer.

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free.

United Kingdom .. 28s. 2d. Abroad.. .. 33s. 6d.

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EDITORIAL COMMENT.

"Newspapers are an essential part of our war organisation."—
(Sir Auckland Geddes, Minister of National Service.)



ALTHOUGH the attacks which developed early in the week may prove to be the prelude to the renewed enemy offensive, there is no doubt that this is considerably overdue. Many have been the hypotheses advanced for the delay, but there is more than a little reason for believing that it is principally due to the disorganisation created in the German arrangements by the tremendous activity of the Allied air services. Sir Douglas Haig has told us that in two months we have destroyed a thousand enemy aeroplanes and dropped over a thousand tons of bombs on railway junctions, ammunition stores and points of concentration. This activity never ceases. Every hour of the day and night, provided the conditions of weather do not make flying impossible—and the weather has to be very bad for that—our machines are engaged in bombing raids far in rear of the enemy's line, or our low-flying machines are

spreading death and demoralisation in the German trenches. It goes without saying that all this activity in the air must produce its effect on the German preparations for a resumption of the great offensive, and must cause a great deal of disorganisation in the enemy's plans. Such an offensive as the Germans undoubtedly contemplate requires meticulous preparation if it is to have the slightest chance of success. It cannot be launched until everything is ready "down to the last button on the last gaiter," and whatever the faults of the Hun, we must admit that he is, at least, a master of organisation, and withal painstaking in his methods. We may be sure, therefore, that the German Command will not strike until the last detail has been arranged, and that it has not arrived at what it considers the ultimate state of organisation for attack is clearly due to the Allied air offensive, which has held back the preparations.

The more we study the reports from the Front, the more we become convinced that the day is fast approaching when, as we said a few weeks ago, the existence of armies above ground will become almost impossible in face of an enemy who has secured command of the air. At this present stage of the Great War, it cannot be said that either side has established "command" of the air, at least in the degree that the Allies hold command of the sea. Nothing but an absolutely overwhelming superiority of material can give that command, and although we have undoubtedly obtained a very definite superiority, that is not quite the same thing. Still, we are able to see already that even such superiority as we do possess has a potent effect on the operations on the ground. Had it not been for that effect, it is reasonably certain that the Germans would have been able to deliver their great blow three, or possibly even four, weeks ago, when the circumstances were a great deal more favourable to them than they are now. Briefly, what the delay imposed on the enemy command by our aerial offensive has meant is that, in the meantime, the whole of the Allied defensive line has been materially strengthened; we have been able to reorganise at leisure the divisions which had suffered in the fighting of March and April, or to relieve them with fresh troops; to make good—and more than good—the losses of guns and material and the expenditure of ammunition; and, most valuable of all, time has been given for many thousands of American troops to arrive to strengthen the man-power resources of

the Allied command. As a matter of fact, it is scarcely going too far to say that the delay has been decisive. And, as yet, we are no more than beginning to feel the effect of our expanded programme of aircraft construction!

The Last Exhibition of Kultur.

We have long ago ceased to be surprised at any exhibition of bestial brutality by the Huns. The murder of civilians ashore and at sea; the doing to death of helpless prisoners of war—what time the Huns we hold in durance wax fat and comfortable—and all the thousand and one acts of rape and rapine, which have made the name of the German stink in the nostrils of civilised men and women, have become so familiar that the records almost leave us cold. But the bombing, murderous and deliberate, of a British hospital far behind the lines in France, in which some hundreds of victims were sacrificed to the Hun lust of murder, has aroused a feeling of white-hot indignation in Britain which has never been matched since the sinking of the *Lusitania*.

There is but one thing to be said about this last and worst page of infamy written by the Huns, and that is that it must be visited with punishment, swift and condign. Obviously, we cannot insult the *personnel* of our Air Service by ordering them to bomb enemy hospitals, even if we would—which is equally impossible. To civilised peoples the emblem of the Red Cross is sacred, and sacred it must remain whatever the Germans may do—with perhaps the exception when the Huns annex this emblem for the protection of their aerodromes. But there are German cities and towns well within the reach of our bombing aircraft. Certain of these have been visited in a spasmodic fashion, and have been bombed, to the intense disgust of the Germans who realise that raids on open Hun towns lead to the "senseless slaughter" of women and children, however holy and praiseworthy the same enterprise may be when it is the women and children of the Allies who are the victims. One of these towns should be picked out for destruction, and should be systematically raided until it becomes absolutely uninhabitable, and the Hun should be informed in unequivocal terms that it is in reprisal for the murder of wounded and medical staff. Further, he should be told just as plainly that a similar future crime will meet with a similar punishment. There is no other argument he understands, but that he does understand his own medicine we know from the squeal that is going up from the raided towns of the Rhineland.

Prizes for War Work Records.

The scheme, originated by Mr. Henry Edmunds, for a system of rewards for industrial records seems to us to be excellent for the time being. Briefly, the idea is to raise a sum of £100,000 to form a central fund for the allocation of prizes for records such as those which have recently been made by shipyard rivetters. It is true that certain interests, notably the executive of the Boilermakers' Society, have expressed themselves as against the principle of rewards such as have called forth the records in question, but, for our own part, we can see no objection at all. There is not the slightest doubt that the introduction of the spirit of sporting emulation into industry can only have the effect of increasing pro-

duction. In the meantime, we do not doubt that a patriotic appeal to the shipbuilders, for instance, to beat each others' records would have a strong effect on output, but unless there is something more than glory attached we are afraid the glamour of competition would be likely to wear off. Besides, why should not the individual or the team, so to say, be marked out for distinction in the case of industrial records equally with individuals or teams which distinguish themselves on the football field or in the boxing ring? We confess we are inclined to think that the former are entitled to the greater consideration, for reasons that are sufficiently obvious.

So far as concerns the opposition of which we have spoken, it seems fairly clear that it has its origin in blind faith in the methods of trade unionism at its worst. Naturally, if the Henry Edmunds scheme should come into being, every man, every working gang or team, would be on his or their mettle, and striving for record output with a view to reaping not only the glory but the solid benefits accruing from success. That would mean good-bye to the pernicious restriction of output, so beloved by the most short-sighted among the Labour "leaders." If that is the only objection to be urged against the scheme, it is no objection at all, but rather a recommendation. So far as concerns the banal argument of the secretary of the Boilermakers' Society that his members should not be "turned into gladiators to provide sport for the idle rich," it is that sort of futile, foolish talk that has done such a deal to turn away the sympathy of thinking people from the Unions. It is simple balderdash, and that is all there is to it.

Women's Part in the Air War.

Speaking at the opening of an exhibition of women's work in munitions production, Mr. Kellaway, Parliamentary Secretary of the Ministry of Munitions, gave some exceedingly interesting facts and figures in relation to women's part in munitions and aircraft production. Fourteen months ago the number of women employed in munition industries was 691,000. Now a round million are so employed; while no fewer than 500 a week are being drafted from the training schools to different works. Referring to the last air raid on London, Mr. Kellaway said that he asked one of the officials of the Ministry if it would be true to say that all offensive and defensive measures against the raiders were carried out by women, except the actual fighting of the machines. The official replied that it was literally true that to every part of the material side at the disposal of our airmen that night the women of this country had made their contribution. There is no doubt the response made by the women to the appeal for help in the war has been wonderful. There is scarcely an industry, or a process connected with any industry engaged on the production of war material, in which women do not have a part, and often in the most unexpected directions. Many of the processes are those in which it was never believed before the war that women were capable of being employed.

Particularly in the production of aircraft, women have done excellently. In a previous article we have emphasised the fact that it is in great part due to our aerial arm that the German offensive will have to be conducted under very much less favourable conditions than the enemy command was at first justified in anticipating. For the material resources which have

enabled our air services to hamper and disorganise the enemy's preparations, we have in very large measure to thank the women workers of the country. Even now we doubt if the full contribution of the women to our war effort is sufficiently well recognised.

Continuing on the subject of the war in the air, Mr. Kellaway said: "I am one of those who believe that if we will ruthlessly use our air arm we can bring this war by that means to a triumphant conclusion. It has now become clear that we have reached a material and personal superiority over the enemy in the air, and if we only exploit that arm properly, and use it ruthlessly without any limitations, except the limitations of humanity, which the British race will always observe, we can bring this war to a triumphant conclusion."

We agree, but we should like to know, simply as a

matter of interest, what Mr. Kellaway would define as "the limitations of humanity." If by the term he means that we should not deliberately bomb German hospitals, we are with him. If, however, he would except German towns or anything else that is German, we should be compelled to differ from him. Unfortunately, we have been compelled by the German disregard of what civilised nations had settled as the ethics of humanity to do things foreign and repugnant to our ideas of conducting war, and we have now arrived at a stage when we cannot afford to be squeamish. We must use our air power ruthlessly until such time as the Hun has repented in sackcloth and ashes of his evil deeds. Then we can once more talk "humanity" to him, but not before. And in that we are certain the women workers of the country will agree.

PAPER-RATIONING.

WARNING TO READERS.—As has been foreshadowed for some time, greater official restrictions upon the sale of papers have become necessary, and after June 24th newspapers will not be permitted to be distributed under the scheme known as "Sale or Return." This means that those readers who wish to receive "FLIGHT" regularly, must place a definite order with their bookstall or newsagent for a copy to be reserved, or, as the only alternative, send an order to the Publishing Office, 36, Great Queen Street, Kingsway, W.C. 2, for "FLIGHT" to be sent each week by post. The direct subscription, by P.O.O. or Cheque, is as follows:—

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United Kingdom ..	7 1	14 1	28 2
Abroad	8 3	16 6	33 0

The above is imperative as from June 24th if you wish to get "FLIGHT" each week.



(La Guerre Aérienne.)

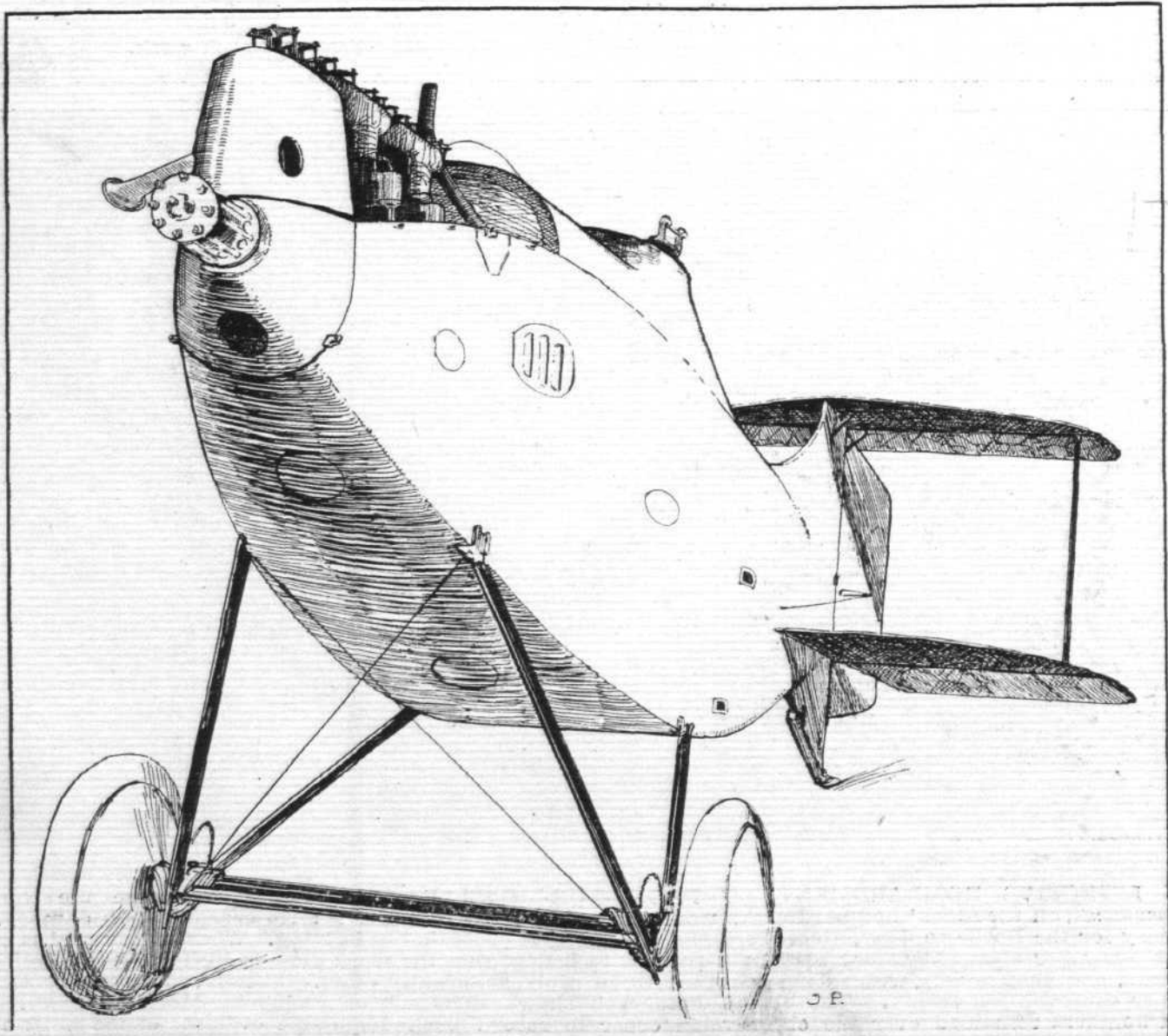
AN EFFECTIVE BOMBARDMENT OF PAGNY-SUR-MOSELLE.—If one were to believe the German *communiqués*, all the Allies' bombardments would be reduced to the formula: No casualties, no damage. It is easy for the Boche to deny, since we cannot always give proof that he is lying. When an air raid is made with a number of machines one may be permitted to believe that the work done is likely to have given good results, and that is why we can never repeat these raids sufficiently often. Luckily, photography enables one to confound the enemy. The above photograph shows an attack on Pagny-sur-Moselle in 1915. The last bombers remained over the objective in order to record the indisputable evidence of the work of the raiding group. They descended sufficiently low to be able to take their eloquent photos. One can distinguish easily the damage done to the works at Pagny-sur-Moselle. One row of establishments is reduced to a skeleton of brickwork; the remainder has become the prey of the flames. Two large craters in the centre show what must have become of the machinery. It will be agreed that it would be impossible to better demonstrate the importance of military reprisals raids.

THE GERMAN H.W. (HANNOVERSCHE WAGGONFABRIK) BIPLANE.

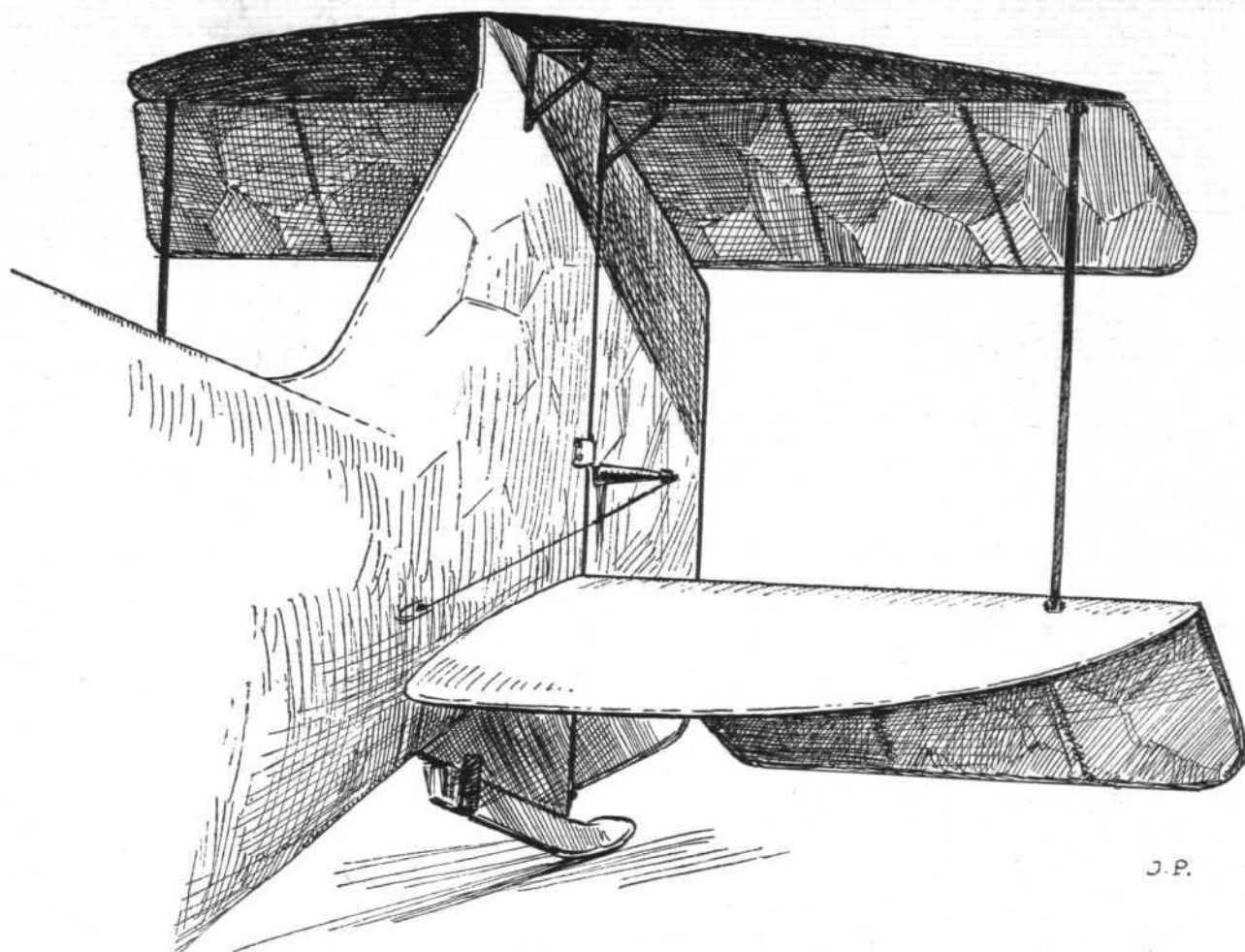
[In our issue of May 23rd, we published some sketches and brief particulars of the German "Mystery" biplane, sent to us by a correspondent in France. Since then we have had an opportunity to examine in detail one of these machines, captured intact. The machine bears in numerous places transfers with the name "Hannoversche Waggonfabrik," and there is thus no longer any mystery attaching to its identity. On the whole the sketches and description sent us by a correspondent were fairly accurate, as will be seen from the accompanying illustrations. We can only deal briefly with the Hannover biplane this week, but hope to return to it in detail as soon as opportunity offers. As the wings were not in place on the machine we examined it has not been possible at present to obtain a view of the complete machine, but the sketches of the body and tail should nevertheless give a good idea of the most characteristic features.—Ed.]

THE most interesting feature of the Hannover biplane, apart from the biplane tail which first drew attention to the machine, is the unusually deep body. Without having actually measured the depth of the body we should judge its maximum depth to be in the neighbourhood of 5 ft. The reason for choosing such a deep body, the cross sectional area of which is great and must, it would appear, necessarily have a fairly high resistance, is somewhat difficult to follow unless it be assumed that the object has been to bring the heads of the occupants almost in line with a continuation of the chord line of the upper plane, thus giving pilot as well as gunner a practically unobstructed view in a forward and upward direction. Whether or not this has been the cause cannot be

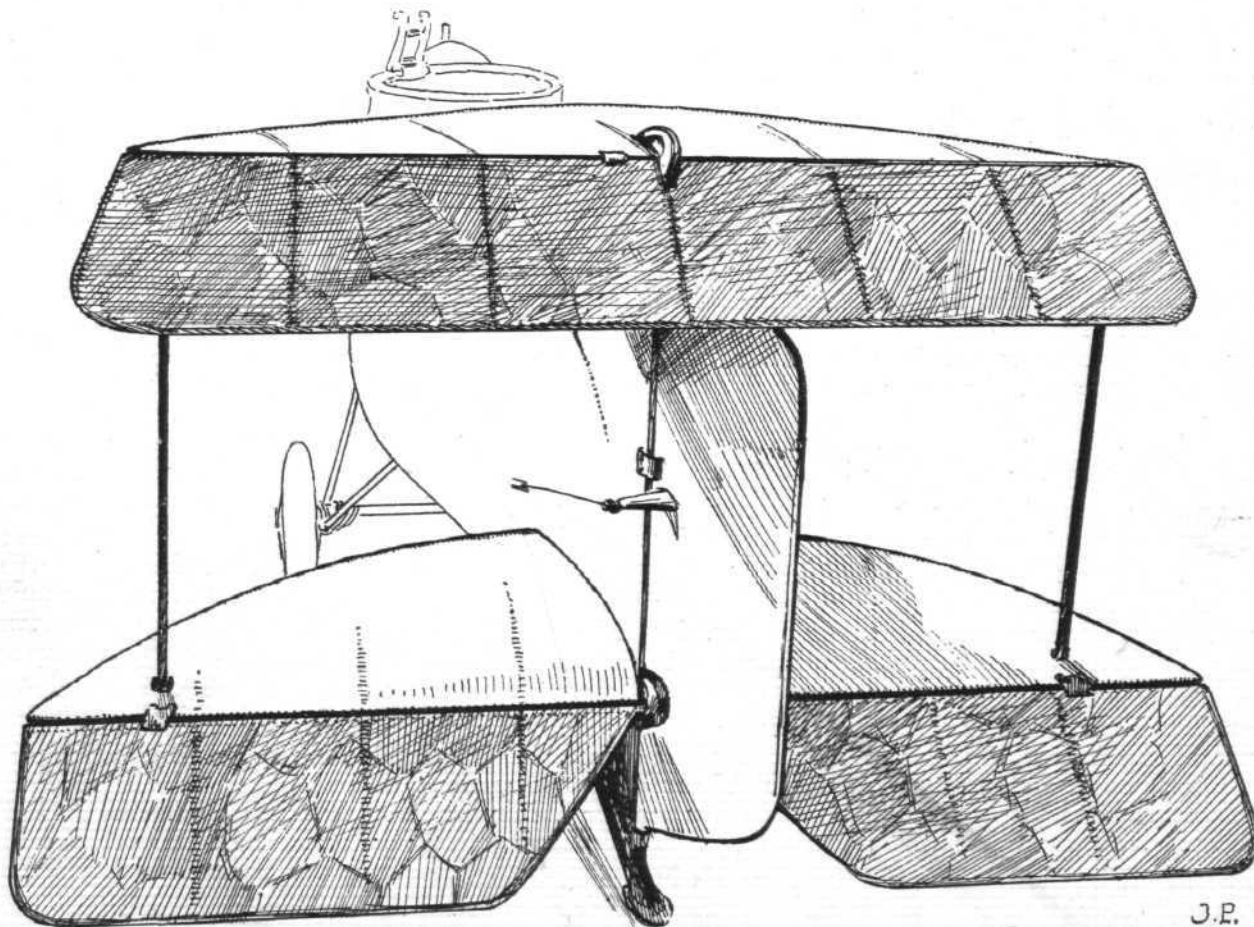
definitely stated, but it would certainly appear to have had that effect. As if to further ensure that the gunner was free to look forward in line with the top plane, his gun ring is mounted in a form of turret, elevated some distance above the main top of the body. It is possible that the gunner has been able to increase his arc of fire beyond that usually coming within the providence of the crew of the rear gun, and fire forward between the planes. This would be possible on account of the fact that there is only one pair of inter-plane struts on each side of the body, the lift cables therefore running out at a rather flatter angle than is usual in a machine of this size. There would, of course, always be the danger of hitting a lift wire, unless a stop were provided preventing the gun from being



THE HANNOVER OR "MYSTERY" BIPLANE.—Three-quarter front view of the body. The chief feature of this machine, apart from the biplane tail, is the enormously deep fuselage, built in the usual German fashion, of a light framework covered with three-ply wood.



J.P.



J.P.

THE HANNOVER OR "MYSTERY" BIPLANE.—Two views of the biplane tail. The elevator of the lower tail plane, it will be noticed, is divided, while the upper elevator is carried right across from side to side. The two elevators are interconnected by a vertical rod inside the fin, joining the cranks of upper and lower elevators.

fired when in line with a wire. Of this there does not appear to be any sign, and it is possible that the designer trusts to the gunner to refrain from firing while the muzzle of the gun is too close to a wire. That this little detail might easily be overlooked in the excitement of a scrap seems probable, but perhaps the German attitude towards this particular subject is the same as that expressed to us some time ago by a French friend while discussing this same feature. Our friend expressed himself as follows: "Well, suppose you do hit one of your own wires. You come down. *C'est la guerre.*" However, most pilots would probably prefer to leave the pinging of his wires to the other chap.

Constructionally the body of the Hannover biplane is that now so frequently found on German machines, a light framework covered with three-ply. In section, however, the body is somewhat unusual, in that at the point of maximum depth it has flat sides and bottom, with a curved deck, while near the nose the section is nearly circular and the tail portion is oval in section, not unlike the tail of a fish. This seems rather the reverse of usual practice.

In the gunner's cockpit there is the usual hinged seat which can be swung back out of the way when the gunner wishes to fire from a standing position. On the port wall of the body there is a wood drum around which the aerial is wound, passing through a wide tube fitting in holes in the bottom of the body. Centrally placed, in front of the gunner's feet, is a framework of steel, mounted so as to pivot around a transverse horizontal axis, and telescopically sprung by two short lengths of tubes and coil springs, which appears to have been used for releasing the bombs. Immediately under this framework there is a sliding trap door in the floor, which reveals, when removed, another compartment underneath the floor boards, between them and the bottom of the body. It is, in fact, a sort of cellar, and a humorously-minded visitor suggested that this was where the gunner kept his *lager*, but closer inspection revealed the fact that in this compartment, and immediately underneath the other, was another sliding trap door, operated by a rather clumsy arrangement of cables and pulleys, surrounded by a rail some eight inches high. When both doors are open the way is clear for the bomb to drop. The bombs were apparently carried in racks on the floor to the right of the release gear, while on the left a number of fittings appear to indicate that here was at one time mounted the wireless set. On the starboard wall of the body is a lever marked Kupplung (Clutch), which has probably been used for throwing the wireless into and out of gear. On the starboard wall are also a couple of electric connections of the wall plug type, used, evidently, for connecting up the gunner's electrically heated suit with the generator circuit. No gun was mounted on the machine we examined, but the gun ring and pivot were of the usual type.

In the pilot's cockpit there were the usual instruments on a dash, and in addition a couple of inclinometers of somewhat unusual type, one for indicating lateral inclination, mounted on the dash,

and another for longitudinal angularity mounted on the starboard side of the cockpit. These inclinometers appeared to consist of an upper semicircle painted blue, which was fixed, and a lower semicircle, red in colour, which always remained horizontal. In appearance, the lower semicircle was like a piece of ruby glass, but probably a closer inspection would prove it to be a liquid contained in a semicircular container.

The controls did not present anything of especial interest. The control column terminated at the top in a double handle, the two parts of which sloped slightly downwards. On this was mounted the trigger for the machine gun, of which only one appears to have been fitted for use by the pilot. The seat was mounted on top of the main petrol tank, a large cylinder placed transversely on the floor of the cockpit. At the pilot's right hand was a hand operated pressure pump, which had a rearward extension enabling it to be worked by the gunner at will. A stamp on the wall of the cockpit gave an indication of the date of manufacture. The stamp read ZAK—which apparently corresponds to our A.I.D.—6/12/17.

Although not in place on the machine we inspected, the wings were available for examination and showed that the span of upper and lower wings was approximately equal. The chord of the upper plane was considerably greater than that of the lower. There was only one pair of interplane struts on each side in spite of the considerable span of the machine, and the top plane had a centre section mounted on two pairs of N's sloping out slightly. The tips of the top plane were raked, and the wing flaps balanced and warped. The lower planes, on the other hand, had rounded tips of the shape commonly known as Bleriot tips from their similarity to the wing tips of that well-known designer's early monoplanes. In the middle of the centre section of the top plane the trailing edge had been cut away, and between the spars were mounted, on the port side the petrol service tank, and on the starboard side the radiator. The latter was partly covered by a semicircular shutter which could be rotated out of the way to give increased cooling. The amount of variation in cooling thus obtainable appeared, however, to be very small.

The motive power was furnished by an Argus engine partly covered in, each three cylinders of which had a common exhaust collector projecting out past the struts of the starboard "N" carrying the top plane centre section. The under carriage was of the Vee type, and appeared to follow along standard lines.

As regards the biplane tail planes, the arrangement of these will be easily followed from an inspection of the illustrations. In design they did not appear to present anything very unusual, and the only point of interest appears to be that although the two fixed planes are connected by struts there is no wire bracing. Each plane is therefore to be considered a simple cantilever, and as their section did not appear to be very deep, the strength would not appear to be all that it might. One can only wonder at the reason for employing a biplane tail. Probably it is to be sought for in the effect of the down draught from the wings, placed as they are close to the top of the body.

See 5-9-18

From Germany to Holland.

The following officers who were prisoners in German have arrived in Holland for internment:—

Capt. A. P. V. Daly, Conn. Ran., attd. R.F.C.; 2nd Lieut. J. B. H. Wyman, R.F.C.; Lieut. D. W. Davis, Sask. R., attd. R.F.C.; 2nd Lieut. W. F. L. Castle, R.F.C.; Capt. Hon. T. W. P. L. Chaloner, Yorks, attd. R.F.C.; Lieut.

W. B. Ellis, A.S.C., attd. R.F.C.; Lieut. E. B. Harvey, London and R.F.C.; Lieut. C. Kerr, R.F.C.; 2nd Lieut. D. H. MacIntyre, A. and S. Hrs., attd. R.F.C.; Lieut. W. J. M. Tomson, R.F.C.; Lieut. J. W. Toone, R. Irish, attd. R.F.C.; Lieut. C. I. Van Nostrand, R.F.C.

The following soldiers have arrived in Holland for internment:—2458 R. G. Johnston, 1746 G. Topcliffe.

THE FOKKER TRIPLANE.

(Continued from page 569.)

AMONG the interesting features of the Fokker triplane mention must be made of the wing section, which alone has made the "wireless" arrangement possible. Although wing sections are nowadays probably thicker, on an average, than they were some years ago, due to the more insistent demands for strength and light weight, there are few machines if any, that can compare in this respect with the Fokker triplane. The maximum depth, which occurs in the neighbourhood of the front part of the composite spar, is no less than 4.95 ins. or practically 5 ins. and this for a chord of only 1 metre (about 3 ft. 3½ ins.). A scale drawing of the wing section is given in Fig. 14, from which the depth at various points along the chord can be found. The web of the rib, which is made of thin three-ply, is unusual in that it is not cut where it abuts against the spar faces, as is general practice, but is continuous from leading to trailing edge. This has been made possible by the fact that the composite spar is of a rectangular section of a maximum depth determined by the rib depth at the rear edge of the spar, which leaves a small space between the top and bottom faces of the spar and the rib flanges. Whether or not this provides any very great increase in the strength of the rib is perhaps doubtful, but keeping the spar of rectangular section would certainly appear to have advantages from the point of view of construction, as all the four strips of the spar may thus be kept of rectangular section instead of, as they would otherwise have to be, being shaped to fit the slopes of upper and lower faces of the spar. As regards the spar itself, reference has already been made in a previous instalment to its general construction. Fig. 14 gives the dimensions of the various component parts of the spar. These dimensions apply to the inner portion of the spar, near the root, and to this point only, as the dimensions vary throughout the length of the spar, an attempt having apparently been made to proportion, to a certain extent, the strength of the spar to the load at any point. As regards the four spruce strips of the spar, these are tapered in plan view, their width from front to back changing from about 2 ins. at the root to about ¾ in. at the tip. The depth of the flanges, on the other hand, remains constant. The ply-wood covering or box spar has also been varied, the outer half being covered with one layer of three-ply, while the inner portion has an extra thickness of three-ply, making in reality a flange of six-ply wood.

As the wings are to be regarded as cantilevers, the object of this construction is evidently to reduce weight to a minimum by reducing the size of the spar where the loading permits of doing so, that is to say more or less gradually from the root towards the tip.

The opinion has been advanced that the Fokker triplane construction is extremely weak. So, on the face of it, would it appear to be, but as the machines have repeatedly been mentioned as doing good work, (although this may possibly refer to a later type) and since the arrangement is very unusual, we have thought it might be of interest to examine whether or not the Fokker system is as weak as one is apt to imagine at first sight. A reference to the front elevation of the machine (published in our issue of May 2nd) shows that the span of the upper wing is greater than that of the middle wing, which is in turn of greater span than the bottom one. From tests

carried out by Mr. J. C. Hunsaker at the Massachusetts Institute of Technology (the results of which were published in "FLIGHT" for November 23rd, 1916), on triplane combinations of wing sections of the R.A.F. 6 type, it appears that for a triplane combination in which the three wings are of equal span and chord and not staggered, the triplane k_y is .0004, while the value of upper, middle and lower wing k_y is respectively .0006, .0002, and .0004. In other words, the k_y of the lower wing is practically the same as that of the triplane combination, while that of the upper wing is very much greater and that of the middle wing considerably smaller. In the case of the Fokker allowance should be made for stagger and for the fact that the three wings are of unequal span, but as we have no data to go on, and since, moreover, any difference in interference caused by the unequal spans will probably not be sufficiently great to seriously affect our purpose of making an *approximate* estimate of the spar stresses, we shall disregard the difference due to unequal spans and take the figures as they stand. The weight of the Fokker triplane is given as about 1,260 lbs. The area of the top wing is about 83 sq. ft., that of the middle wing 54.5 sq. ft., and that of the bottom wing 51.9 sq. ft. Assuming the lift distribution to be the same as that found by Hunsaker, we obtain a lift of 9.21 lbs./sq. ft. of the upper wing, 3.09 lbs./sq. ft. of the middle wing, and 6.14 lbs./sq. ft. of the lower wing—the average loading being that of the bottom wing, or 6.14 lbs. per sq. ft.

Fundamentally the Fokker wing bracing is such that each wing may be considered a cantilever beam, and they would be truly so except for the struts, or rather ties, connecting them. These ties, however, only serve to force the middle and lower wings, which are more lightly loaded on account of the load distribution and also by reason of their shorter span, and which have the same spar section as the upper wing, to share some of the load on the top wing. If, therefore, we disregard the assistance given the top wing by the other two, and if we further assume a uniform distribution along the span of the wing instead of taking into account that the portion of a wing near the tip is always more lightly loaded than the inner part, we can hardly be accused of being unduly optimistic with regard to the Fokker wing system.

The load carried by the upper wing in the Fokker triplane is $9.21 \times 83 = 764.43$ lbs., say 770 lbs. The central span is about 5 ft. 2 ins., leaving on each side a cantilever of about 8 ft. 4 ins. or 100 ins. Assuming a uniform loading along the span, and remembering that the bending moment on the centre section is $\frac{wl^2}{8}$, while that on the cantilever

portions is $\frac{wl^2}{2}$, it will be seen that compared with the bending moment on the cantilever, the bending moment on the centre span is negligible. As a matter of fact it is only about 1,400 lb. in. The loading per inch run is 2.9 lbs., and the bending moment on the cantilever is $\frac{wl^2}{2} = \frac{2.9 \times 100^2}{2} = 14,500$ lb. in.

From Fig. 14 it will be seen that the dimensions of the four spruce flanges of the spar are 2½ ins. by ½ in., so that the area of the four spruce sections

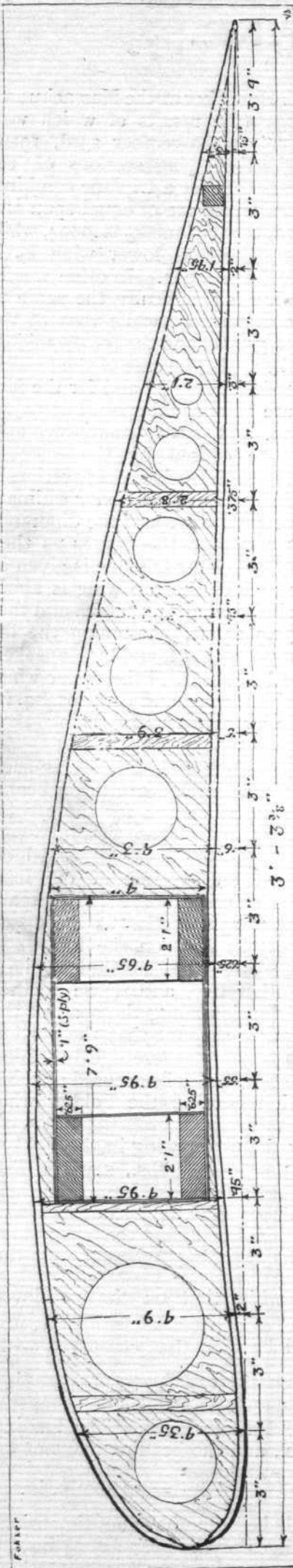


Fig. 14.—The wing section, to scale, of the Fokker triplane. The web of the rib is made of very thin three-ply wood, and the flanges of spruce. The composite spar consists of four strips of spruce and of a box made of plywood.

is 5.36 sq. ins. The depth of the spar is 4 ins., and the section modulus Z may be taken with sufficient accuracy as being equal to area of flanges multiplied by half the depth of the spar, or $5.36 \times 2 = 10.72$. Assuming the strength of spruce as being 8,500 lbs. sq. in. the moment of resistance of the spar flanges will be: $8,500 \times 10.72 = 91,120$ lb. in.

Treating the box spar formed by the ply-wood separately, the section modulus $Z = \frac{1}{6 \times 4} (7.88 \times 64 - 7.38 \times 52) = 5.02$, and the moment of resistance of the ply-wood box, assuming the strength of the ply-wood to be the same as that of spruce, will be: $8,500 \times 5.02 = 42,670$ lb. in.

The total moment of resistance of the spar will then be $91,120 + 42,670 = 133,790$ lb. in. Without knowing the travel of the centre of pressure on the Fokker wing section it may reasonably be assumed to be such that it may coincide with one flange of the composite spar, and to be on the safe side we shall take it that when the c.p. is in this position the strength of the composite spar is reduced to half. The moment of resistance is then 66,895 lb. in., and as the maximum bending moment was found to be 14,500 lb. in., the factor of safety is apparently about 4.5. This is without regard to the fact that this load is greatly reduced by the interplane struts, by how much is rather outside the scope of a descriptive article like the present to determine, but to which we may refer on a future occasion. One can, therefore, only arrive at the conclusion that the Fokker wing bracing system need not be inherently weak, although detailed calculations based upon more exhaustive data than we have available would possibly indicate that the spar weight compares somewhat unfavourably with that of spars of more usual type and arrangement.

As regards the aerodynamical qualities of the Fokker wing section, it is difficult to express an opinion. Generally speaking machines of the Fokker class have been found most efficient for their purpose when fitted with wings of a section giving a rather low k_d , but a good L/D ratio, whereas the deeply cambered section, having a very high value of the lift coefficient, has generally a smaller L/D value. The

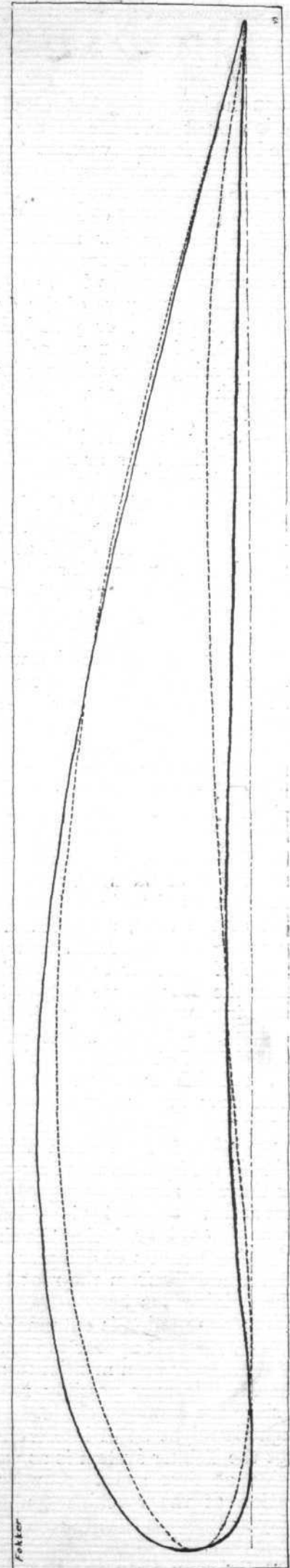


Fig. 15.—A comparative sketch showing differences between the Fokker wing section and Dr. Schukowsky's aerofoil, described in "Properties of Aerofoils," by A. W. Judge. The Fokker section is shown in full lines. It will be noted that only the trailing portion of the upper surfaces of the two sections coincide.

opinion has been expressed that the Fokker wing section resembled that tested by Dr. Schukowsky. In order to ascertain if this were the case we have plotted the two sections shown in Fig. 15. Some difficulty was experienced owing to the fact that the dimensions of the Schukowsky aerofoil given in A. W. Judge's book "Properties of Aerofoils," did not, when plotted out, give a fair curve. However, by comparison with the small illustration in above book, we were able to plot out an approximately correct section of the Schukowsky aerofoil. In Fig. 15 the Schukowsky section is shown in dotted lines. It will be seen that except for the trailing portion of the upper surface there is little or no resemblance between the two sections. It would therefore be futile to attempt to predict, from a knowledge of the Schukowsky coefficients, the performance of the Fokker wing section. One can only point out that it appears probable that the section has been chosen primarily with a view to accommodate the very deep spars, and that it has been found in practice to give reasonably good results—probably especially at a considerable altitude. It would appear that the section is suited for good climb rather than for great speed, and according to German claims, the climb of the Fokker is what they like to boast of rather than the speed. Whether or not the latter is made up for by an ability on the part of the Fokker

triplane to climb rapidly and to a great altitude, hence to dive on to its victim from above, we cannot say. It is possible that it may be. Taking it all around, it is doubtful if the gain in reduction of head resistance due to absence of external lift wiring is sufficient to make up for the necessarily heavier wing construction. Of strength, it would appear from the foregoing that one can only conclude that this can be provided to an adequate degree.

The following dimensions and data are taken from the official report on the Fokker triplane:—

Identification marks.—R.F.C. No. G. 125; Maker No. 1856; Military No. FOK. D.R.I. 144/17; date of construction, 20.10.17.

Weights (as stencilled on machine).—Weight, empty, 376 kg. (829 lbs.); permissible load (including fuel), 195 kg. (430 lbs.); total weight, 571 kg. (1,259 lbs.).

Weight of engine.—334 lbs.; including hub, magneto, oil pump and carburettor. (NOTE.—Weight of 110 h.p. Le Rhone is 330 lbs.)

Tank capacity.—Petrol, 16 gallons (approximate); oil, 4 gallons (approximate); approximate duration, 2½ hours at 10,000 ft.

From the above it is possible to construct the following approximate weight analysis: Fuel, oil and tank, 170 lbs. (allowing tank, 18 lbs.); crew, 180 lbs.; military load, 98 lbs.; engine and propeller, 358 lbs. (allowing propeller, 24 lbs.); structure, 453 lbs. (including engine bearers and instruments); structure percentage, 36; surface of main planes, 205 sq. ft. (approximately); estimated B.H.P. (by analogy with 110 h.p. Le Rhone), 113; lbs. per square foot, 6.14; lbs. per B.H.P., 11.15.

TRADE PARLIAMENTS AND THEIR WORK.

By ERNEST J. P. BENN, Chairman Industrial Reconstruction Council.

VI.—RESTRICTIONS AND PLEDGES.

As soon as the war was properly started Parliament was asked to pass an enactment known as the Defence of the Realm Act. At that time we were working with a Government machine of a well-known model, and with Departments with whose habits and proceedings the community in general was fairly well familiar. No sooner had the Defence of the Realm Act been put upon the Statute Book than the process began of commandeering hotels and starting new Government Departments. Ever since we have been adding week by week to the army of persons who control us in one way or another. We have almost reached the stage when every commodity has its own office with its own controller, and it is estimated that there are to-day at least eighty authorities having the power to issue Regulations under the Defence of the Realm Act. This is the way that we carry on war, and so long as the restrictions and regulations to which we are daily required to conform have for their object the defeating of the enemy, no one is entitled to complain.

There are very few men in business who profess to be acquainted with more than a percentage of the rules which have been laid down for their conduct. If a new piece of business is contemplated, the habit now is to turn to the Regulations or to enquire of the appropriate Department, in order to make sure that one or other of the intricate orders is not infringed. There are still a number of simple creatures who are comforting themselves with the fond delusion that at the end of the war the repeal of the Defence of the Realm Act is a matter of course, and that the restrictions and regulations which have been made under it will, on one happy morning in the future, suddenly disappear. They think of the glorious days when their liberty will be restored, and when we shall be able to go back to that traditional freedom and independence of action which has always been the leading characteristic of this country. Such views can only be excused on grounds of ignorance. The restrictions under which we suffer so severely have been imposed gradually, the process has been a gentle one, and we must give our rulers credit for having, so far as they were able, considered at every turn the delicate machinery of commerce with which they were dealing. There is nothing so sensitive and nothing so susceptible to shock as trade and commerce, and it is at least arguable that a sudden restoration to the old conditions might prove absolutely disastrous. It is more than likely that upon expert examination it will be found advisable to go through the process of undoing the last four years at a gentle pace and in such a way that the conditions for which we long so earnestly may be given to us only when we are fitted and able to enjoy them.

It will be seen that this question of Government restrictions is intimately mixed up with the question that we have already discussed—Demobilisation and Government Stores—and very little thought will be sufficient to show that great dangers are ahead unless the people who really understand the needs of each of our trades are prepared to apply their minds to the preparation of plans which will give them the maximum opportunity to get back to normal and satisfactory conditions. Each Trade Parliament should prepare a schedule of all the Defence of the Realm Regulations which have any bearing upon the trade it represents, and working from such a schedule each Parliament should prepare a detailed statement as to how best these Regulations should be removed. It will probably be found convenient and wise to start by the removal of some of them only, but which these may be none but the trade itself can say. It will undoubtedly be found wise to continue for a time some of these restrictions, and here again this is a matter which can only be settled by experts in conference.

Another branch of work very closely akin to war restrictions is that connected with war pledges. War pledges have been given, not only to trade unions but to many other parties, such as bankers and merchants. The Government, on behalf of the nation, has distributed promises lavishly, and these promises, so far as most of them are concerned, will thoroughly justify the old reference to the pie-crust, as very few of them will, in the nature of things, ever be kept. The attitude of the Labour Party is that they recognise the impossibility of redeeming war pledges, but they cling, nevertheless, to those pledges, as they are fully entitled to do, as a basis for bargaining.

All these pledges, to whomsoever they may have been given, must be studied, and plans must be made in advance with regard to them. It is quite unthinkable that we should attempt to face the crisis of peace with this series of problems under present conditions. The crisis of peace, and that is indeed what it must be, will be sufficiently serious from the business man's point of view in any case, and unless pains are taken beforehand to settle such questions as permit of previous consideration, the crisis may assume disastrous proportions. It is easy to talk of getting on with the war and make this the excuse for neglecting to think of questions of reconstruction. On the other hand, those who are prepared to look below the surface in this matter will realise that it is our bounden duty to those who are sacrificing their all to the purposes of the war that we should endeavour to prepare a state of affairs in which they will at least stand some chance of finding a welcome when they come home.

IN THE HANDS OF THE ENEMY.

THE following is an official list, published in Germany, of British machines which the Germans claim fell into their hands on the Western Front during the month of March, 1918:—

21 Sopwith single-seaters.

- Clerget No. 8477, Lieut. Niel, dead.
- No. 9147, Lieut. Edmonds, wounded.
- No. 4889, name of occupant could not be ascertained, dead.
- No. 9229, Lieut. Holt, fate unknown.
- No. 6720, Capt. Luxmoore, prisoner.
- No. 1566, Capt. Russell, dead.
- No. 3781, Lieut. Steevas, prisoner.
- No. 7217, Lieut. Allison, dead.
- No. 9193, Lieut. H. J. Dougoll, prisoner.
- No. 9317, Lieut. Schleyk, known as Falkenberg, prisoner.
- No. 5249, Capt. J. Law, prisoner.

In the case of 10 Sopwith single-seaters the numbers of the machines and the names of the occupants could not be ascertained.

20 S.E. 5 Single-seaters.

- No. 8264, name of occupant could not be ascertained, prisoner.
- No. 9538, Major L. A. Tilney, dead.
- No. could not be ascertained, Lieut. T. Forster, prisoner.
- Motor Hispano-Suiza, No. 2233, Lieut. W. F. Poulter, prisoner.
- No. 9157, name of occupant could not be ascertained, dead.
- No. could not be ascertained, occupant wounded.

Two-seaters.

- Motor, Wolseley-Suiza, No. 2139, 2328, Lieut. J. A. Kudden, dead, name of other occupant could not be ascertained. Both occupants dead.

In the case of 12 S.E. 5's the numbers of the machines and the names of the occupants could not be ascertained.

15 Sopwith camels. Single-seaters.

- No. 3905, 2nd Lieut. R. H. Casgrain, prisoner.
- No. 4719, Lieut. J. H. Flere, prisoner.
- No. 7230, 2nd Lieut. K. D. Champbell, prisoner.
- No. could not be ascertained, Lieut. E. E. Heath, wounded.
- No. could not be ascertained, Lieut. Ivany, prisoner.
- Motor No. 15633, Lieut. A. Clark, dead.
- No. could not be ascertained, occupant, a Canadian, prisoner.
- No. 6420, Capt. Rich. Minifie, prisoner.

Two-seaters.

- Clerget No. 21060, Lieut. I. N. L. Millett, dead, name of other occupant could not be ascertained.
- No. 5208, Lieut. W. H. Nicholls, prisoner, name of other occupant could not be ascertained.
- No. could not be ascertained, Alfr. Leonhard, Jurgis Jaylor.

In the case of 4 Sopwith camels, the numbers of the machines and the names of the occupants could not be ascertained.

1 Sopwith Dolphin single-seater.

- No. 3905, name of occupant could not be ascertained.

15 Bristol two-seaters.

- Motor, Siddeley-Deasy, No. 22825, names of occupants could not be ascertained, dead.
- Rolls-Royce, No. 399, Capt. Kennedy, Lieut. G. Grill, dead.
- No. 4824, Lieut. J. A. A. Ferguson, Lieut. L. Long, prisoner.

- No. 1251, Lieut. Cyrill Clutterbock, Henri Sparks, prisoner.
- No. 1250, Lieut. A. P. B. Boyce, Lieut. Cyrill B. Freton, prisoner.
- No. unknown, G. R. Crammond, Lieut. N. B. Wells, prisoner.

- No. unknown, Lieut. M. Watson, Lieut. Allan.

- No. 4844, name of occupants could not be ascertained.

- No. unknown, Lieut. Lee, dead, name of other occupant could not be ascertained.

- No. 1171, names of occupants could not be ascertained. Observer dead, pilot prisoner.

In the case of 5 Bristol two-seaters, the numbers of the machines and the names of the occupants could not be ascertained.

10 de H. 4 two-seaters.

- Motor Rolls-Royce, No. 7235, Lieut. McKim, Lieut. C. B. H. Pfolliot, dead.

- No. 8043, Lieut. R. A. Mayne, wounded, Lieut. F. V. Scott, dead.

- Motor No. 7255, Lieut. J. Attwood, dead, name of other occupant could not be ascertained.

- Motor Rolls-Royce, 2nd Lieut. R. Culdercott, F. Thomas, prisoner.

- No. 7976, Lieut. Colograve, dead, observer wounded.

- Motor No. 12153, Lieut. Allen, Gunner Sutcliffe, prisoner.

In the case of 4 de H 4 two-seaters the numbers of the machines and the names of the occupants could not be ascertained.

10 R.E. 8 single-seaters.

- Motor Wolseley-Hispano, No. 793, Capt. Whitehead, dead.

- No. 6025, name of occupant could not be ascertained.

- No. 6564, name of occupant could not be ascertained.

- No. 220118, occupant dead.

- No. 8884, Lieut. E. Pickford, prisoner.

In the case of 5 R.E. 8's the numbers of the machines and the names of the occupants could not be ascertained.

9 Spads, single-seaters.

- No. 1945, occupant dead, name could not be ascertained.

- No. 1019, Mech. Gay.

- No. 13, name of occupant could not be ascertained.

In the case of 6 Spad single-seaters the numbers of the machines and the names of the occupants could not be ascertained.

2 Nieuports, single-seaters.

- No. 5624, Lieut. L. A. Edens, dead.

- No. 6823, Lieut. R. E. Neale, dead.

3 Martinsydes.

- No. 7767, name of occupant could not be ascertained.

- No. B. 102, name of occupant could not be ascertained.

In the case of 1 Martinsyde single-seater the number of the machine and the name of the occupant could not be ascertained.

2 B.F.'s.

The numbers of the machines and the names of the occupants could not be ascertained, one dead.

1 F.E. two-seater.

- No. 5700, Lieut. Taylor, Lieut. Shakesby, prisoner.

In addition 10 other machines, whose type could not be ascertained, fell into our hands.

SOUTH-EAST FRONT.

1 R.E. single-seater.

- No. could not be ascertained, Lieut. Gaynor, prisoner.

Attempted Raids on Paris.

THE following *communiqués* were issued in Paris on May 23rd:—

"Last evening enemy aeroplanes, crossing the lines, made for Paris. The alarm was given by our observation posts, and the raiders were received by a violent barrage fire. No enemy machine flew over Paris. One of them dropped some bombs on a point in the Paris area. There were no victims, and no damage is reported. The alarm was given at 11.15 p.m., and the 'All clear' at 12.20 a.m."

The following official message was issued at 4 a.m.:—

"A second alarm was given at 1.24 this morning. Several relays of enemy aeroplanes made for Paris. Our observation posts met them with a very violent artillery barrage. Our aeroplanes went up. A certain number of bombs were dropped in the Paris area. The 'All clear' was given at 3.35 a.m."

A further report was issued at 10.45 a.m.:—

"The enemy machines which took part in the second raid numbered about thirty. They encountered the powerful barrage fire of our artillery posts, which worked in conjunction with our defence squadrons, of which fifty-four machines took the air. Only one enemy aeroplane reached the capital. It dropped a few bombs, killing one person and injuring twelve. A number of bombs were dropped in outlying districts of Paris, causing some casualties."

Two squadrons of German machines attempted to reach Paris on the night of May 21st. One raider was brought down in flames north of the city.

The first group dropped a few bombs in the outer suburbs, and three people were killed and several injured. The defence appeared to be excellently organised. The alarm was given at 10.45 p.m. and the "All clear" at about 1 o'clock.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

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The Lords Commissioners of the Admiralty and the Army Council having signified their approval, THE ROYAL AERO CLUB has instituted and is administering this Fund for the benefit of Officers, Non-Commissioned Officers and Men of the Royal Air Forces who are incapacitated on active service, and for the widows and dependants of those who are killed.

Subscriptions.

	£	s.	d.
Total subscriptions received to May 16th, 1918	12,752	5	8
Charles E. Best	3	3	0

Total, May 28th, 1918 12,755 8 8

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

THE ROLL OF HONOUR.

The following casualties are announced by the Air Ministry:—

Killed.

2nd Lieut. J. C. Attewell, R.A.F.
2nd Lieut. J. D. Baird, R.A.F.
2nd Lieut. O. W. Bannister, R.A.F.
2nd Lieut. W. J. Barker, R.A.F.
2nd Lieut. A. G. Boardman, R.A.F.
2nd Lieut. N. Bowden, Notts. and Derby (T.) and R.A.F.
2nd Lieut. H. G. Browne, R.A.F.
Lieut. H. J. Browne, R.A.F.
2nd Lieut. J. H. Carthew, R.A.F.
2nd Lieut. R. L. J. Davies, R.A.F.
2nd Lieut. L. J. Derrick, E. Kent R., attd. R.A.F.
Lieut. E. I. Dexter, North'd Fus. and R.A.F.
2nd Lieut. D. C. Fairbairn, R.A.F.
2nd Lieut. J. H. Farnham, R.A.F.
2nd Lieut. A. Fleming, R.A.F.
Flight Sub-Lieut. H. R. Gillett, R.A.F.
Lieut. H. W. Girdlestone, R.A.F.
Lieut. R. A. Gliddon, Middx. R., attd. R.A.F.
Lieut. L. A. Greenwood, R.A.F.
2nd Lieut. C. R. Hames, R.A.F.
Lieut. A. M. Hepworth, R. W. Surr., attd. R.A.F.
Lieut. K. C. Herron, Essex Yeo. (T.F.), attd. R.A.F.
Lieut. R. B. Hill, R.A.F.
2nd Lieut. A. R. Holthouse, R.A.F.
2nd Lieut. R. Homersham, E. Yorks R. (T.F.), attd. R.A.F.
2nd Lieut. C. B. Hunt, R.A.F.
Lieut. Viscount W. H. A. Ipswich, C. Gds. and R.A.F.
2nd Lieut. N. R. Joyce, R.A.F.
Lieut. W. H. King, Essex R. (T.F.), attd. R.A.F.
Lieut. C. Lankin, R.A.F.
2nd Lieut. V. W. V. Lowrie, R.A.F.
2nd Lieut. D. P. Macintyre, R.A.F.
Lieut. E. D. Marrable, R.F.A., attd. R.A.F.
2nd Lieut. A. E. Masters, R.A.F.
2nd Lieut. J. P. Owen-Holdsworth, R.A.F.
2nd Lieut. S. Parry, R.E., attd. R.A.F.
Capt. F. B. Reece, R.E., attd. R.A.F.
Lieut. R. Robinson, R.A.F.
Capt. S. W. Rosevear, D.S.C., R.A.F.
Major C. R. Rowden, Worc. R. and R.A.F.
2nd Lieut. L. J. Van Staden, R.A.F.
Lieut. W. G. Whalley, R.A.F.
2nd Lieut. P. W. Woodhouse, R.A.F.
2nd Lieut. A. E. G. Williams, R.A.F.
2nd Lieut. J. R. Wylie, R. Dub. Fus. and R.A.F.
2nd Lieut. F. J. Young, R.A.F.

Previously Missing, now reported Killed.
2nd Lieut. J. B. Coward, R.A.F.

Wounded.

Lieut. R. C. Berlyn, R.A.F.
2nd Lieut. H. W. Collier, R.A.F.
2nd Lieut. H. J. Collins, Yorks Hus. (T.), attd. R.A.F.
Maj. R. S. Dallis, R.A.F.
2nd Lieut. C. F. G. Doran, R.A.F.
2nd Lieut. A. G. Edwards, R.A.F.

Lieut. D. Gardner, M.C., Dragoon Gds., attd. R.A.F.
2nd Lieut. G. J. Glazier, R.A.F.
2nd Lieut. R. H. Harmer, R.A.F.
2nd Lieut. E. C. Harrison, R.A.F.
2nd Lieut. W. L. Harrison, R.A.F.
2nd Lieut. M. L. James, R.A.F.
2nd Lieut. C. R. Lee, R.A.F.
2nd Lieut. C. E. Lovick, R.F.A. (S.R.), attd. R.A.F.
2nd Lieut. E. L. H. MacLeod, Worc. R., attd. R.A.F.
2nd Lieut. F. A. W. Mann, R.A.F.
2nd Lieut. A. McDunlop, Sco. Rif. and R.A.F.
2nd Lieut. J. H. McGregor, R.A.F.
2nd Lieut. R. N. McLean, R.A.F.
2nd Lieut. W. E. McLean, R.A.F.
Capt. H. T. Mellings, R.A.F.
2nd Lieut. H. S. Montgomerie, R.A.F.
2nd Lieut. J. H. Pascoe, D.C.L.I. and R.A.F.
Lieut. N. Peters, North'd Fus., attd. R.A.F.
Capt. T. Phillips, Welsh Regt. and R.A.F.
2nd Lieut. V. F. A. Rolandi, R.A.F.
2nd Lieut. A. de M. Severne, R.F.A. (T.), attd. R.A.F.
2nd Lieut. N. F. Spurr, R.A.F.
2nd Lieut. H. Stanners, R. Muns. Fus., attd. R.A.F.
Lieut. J. Thomson, R.E., attd. R.A.F.
2nd Lieut. H. B. Walker, R.A.F.
2nd Lieut. J. L. Walton, R.A.F.
2nd Lieut. H. Wesley-Sequi, R.A.F.
2nd Lieut. J. A. Weatherley, R.A.F.
2nd Lieut. G. N. Wilton, R.A.F.
Capt. J. S. Windsor, M.C., S. Wales Bord. and R.A.F.
2nd Lieut. F. Young, R.A.F.

Missing.

Lieut. S. Birch, R.A.F.
2nd Lieut. R. E. Bright, R.A.F.
2nd Lieut. A. C. G. Brown, R.A.F.
2nd Lieut. C. V. Carr, D. of Well. R., attd. R.A.F.
Lieut. G. M. Cartmell, R.A.F.
Capt. G. Chadwick, Manch. R. (T.F.) and R.A.F.
Capt. C. C. Clark, R.A. and R.A.F.
Capt. T. Colville-Jones, R.A.F.
Lieut. G. Cuttle, M.C., R.F.A., attd. R.A.F.
2nd Lieut. A. F. Dawes, R.A.F.
2nd Lieut. G. Hamilton, R.A.F.
Lieut. P. R. Hampton, R.A.F.
Lieut. H. B. D. Harrington, Lond. R. (T.F.) and R.A.F.
2nd Lieut. R. L. Johnston, R.A.F.
Lieut. L. C. Hickey, R.A.F.
2nd Lieut. G. A. Leckie, R.A.F.
Capt. R. McDonald, R.A.F.
Lieut. H. L. Nelson, R.A.F.
2nd Lieut. F. Newton, R.A.F.
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Lieut. C. G. Tysoe, R.A.F.
Lieut. A. M. Whitford-Hawkey, R.A.F.

Lieut. C. B. Whyte, R. Scots., attd. R.A.F.
2nd Lieut. J. C. Wood, R.A.F.
2nd Lieut. B. W. Wright, R.A.F.

Prisoners.

Lieut. D. C. Hopewell, R.A.F.
Lieut. G. G. MacPhee, H.L.I. (T.F.) and R.A.F.
Lieut. G. R. J. Parkinson, R.A.F.

The following are reported by the Admiralty:—

Previously Missing, now reported Killed.

Flight Sub-Lieut. J. L. Allison, R.N.

Previously Missing, now presumed Killed.

Skpr. R. Brown, R.N.R. (W.S.A. 10).
Flight Sub-Lieut. J. E. C. Hough, R.N.
Prob. Flight Officer G. H. Morang, R.N.
Flight Sub-Lieut. G. B. G. Scott, R.N.
Flight Sub-Lieut. J. H. Winn, R.N.

Died of Injuries.

F 13285 1st Gr. Air-Mech. F. R. Jones, R.N.A.S.

Previously Missing, now reported Prisoner.

Acting Flight Commander R. P. Minifie, D.S.C., R.N.

The following are reported by the War Office:—

Killed.

Lieut. J. O. Allison, W. Ont., attd. R.A.F.
Lieut. W. A. J. Buckland, Aus. F.C.
Lieut. M. S. Kelly, Manit., attd. R.A.F.
Capt. N. M. J. Kohnstamm, Manch., attd. R.A.F.
Lieut. A. M. Martyn, Cent. Ont., attd. R.A.F.
Capt. H. D. E. Ralfe, Aus. F.C.

Previously Missing, now reported Killed.

2nd Lieut. A. Butt, Bedford, attd. R.F.C.
2nd Lieut. L. Cann, R.F.C.
Lieut. J. A. Convery, Can. Cav., attd. R.A.F.
2nd Lieut. G. B. Craig, R.F.C.
Lieut. A. C. Gilmour, Can. Rly. Trps., attd. R.A.F.
Capt. H. Hewett, M.C., R. Berks, attd. R.F.C.
2nd Lieut. B. Starfield, R.F.C.

Accidentally Killed.

Capt. G. Robinson, M.C., Can. Cav., attd. R.A.F.

Wounded.

Lieut. E. G. Grant, Alta R., attd. R.A.F.
Lieut. J. Grimshaw, Manit., attd. R.A.F.
Lieut. W. R. W. Henderson, Manit., attd. R.A.F.

Missing.

Lieut. C. A. Pelletier, Can. Eng., attd. R.A.F.
Capt. P. R. White, E. Ont., attd. R.A.F.

Previously Missing, now reported Prisoners in German hands.

2nd Lieut. H. P. Blake, R.F.C.
Capt. E. B. Cahusac, M.C., S. Staffs., attd. R.F.C.
2nd Lieut. R. Caldecott, R.F.C.
2nd Lieut. H. F. Dougall, R.F.C.
Capt. J. H. Hedley, R.F.C.
2nd Lieut. E. W. Pickford, R.F.C.
2nd Lieut. D. W. Kent-Jones, R.E., attd. R.F.C.
Capt. K. R. Kirkman, R.F.C.
2nd Lieut. A. T. W. Lindsay, R.F.C.
2nd Lieut. C. J. W. McKeown, R.F.C.
2nd Lieut. G. P. F. Thomas, Dur. L.I., attd. R.F.C.

THE SIDEWAYS BUCKLING OF LOADED BEAMS OF DEEP SECTION.

By J. PRESCOTT, M.A., D.Sc., Mathematician on the Engineering Staff of the Daimler Co.

It is a well-known fact that a loaded beam whose depth is much greater than its breadth may buckle sideways before it will break by bending in a vertical plane. There is, in fact, for a beam loaded and supported in any particular way, a critical buckling load, just as there is a critical load for a strut given by Euler's theory. If buckling were not possible, the strength of a beam of given sectional area under lateral loads would increase as the depth increases, but the possibility of buckling puts a limit to the depth for practical purposes.

I have investigated mathematically the problem of sideways buckling, and have obtained results for several useful cases. These results are given below. The analysis is not supplied at present, because it is very long and rather cumbersome in some of the cases.

The buckling load depends on the flexural rigidity for sideways bending, and on the torsional rigidity of the beam. It is clear that torsional rigidity has something to do with the question, because the beam could not buckle without twisting.

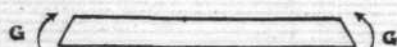
The following are the meanings of the symbols used in the formulæ:—

- E = Young's modulus.
- I = The smallest moment of inertia of the section (i.e. the one that occurs in the equations for sideways bending).
- N = The modulus of rigidity.
- KN = Torsional rigidity of the beam.
- L = Length of beam.

In every one of the following cases it is assumed that there is no twist at an end which is held or supported, that is, the sections of supported ends are held with the depth in a vertical line.

By a "supported end" will be meant an end resting on supports with the depth held vertical, but the end not otherwise constrained. By a "clamped end" will be meant an end differing from the supported end in having an extra constraint. This extra constraint keeps the tangent to the central line of the section fixed horizontally in the same position as when there is no buckling, but the theory assumes that the depth is so great compared with the breadth that the actual amount of bending in a vertical plane is always quite small.

Case 1.—Beam under a pair of equal and opposite couples,



G at its ends. Ends free except that sections have no twist there.

The buckling, when it occurs, takes place in the plane perpendicular to the planes of the couples. The buckling couple is given by

$$GL = \pi \sqrt{EIK}.$$

Case 2.—similar to the last, except that the ends are clamped, that is, not free to bend sideways.

The couple is given by

$$GL = 2\pi \sqrt{EIK}.$$

Case 3.—The beam is free at one end, where it carries a load P. The other end is held quite rigidly.

The load, P, must be supposed to be applied at the middle of the end section.

The critical load is given by

$$PL^2 = 4.01 \sqrt{EIK}.$$

Case 4.—Beam carrying a load, P, at the middle and simply supported at the ends.

$$PL^2 = 16.94 \sqrt{EIK}.$$

Case 5.—Similar to the last case, except that the ends are clamped against horizontal bending.

$$PL^2 = 25.86 \sqrt{EIK}.$$

Case 6.—The beam carries a load, W, uniformly distributed along the beam. The ends are simply supported as in Case 4.

$$WL^2 = 28.3 \sqrt{EIK}.$$

Case 7.—The beam carries a load, W, uniformly distributed along its length, is quite free at one end, and held rigidly at the other.

$$WL^2 = 12.86 \sqrt{EIK}.$$

In every case the load is supposed to be applied on the central line of the beam. If the load is applied at the top of the beam, it will clearly take a less load to buckle the beam.

The constant, K, is the coefficient that occurs with N in the theory of the torsion of prisms. For most compact sections, such as ellipses, rectangles, and triangles, it has been shown to be nearly equal to

$$\frac{1}{40} \frac{A^4}{J}$$

where A is the area of the section and J its polar moment of inertia.

For a rectangular section of breadth b and depth d the approximate rule gives

$$K = \frac{1}{40} \frac{b^4 d^4}{(b^2 + d^2)bd} = \frac{3}{10} \frac{b^2 d^2}{b^2 + d^2}$$

THE 240 H.P. (8-CYLINDER) MERCEDES.

(Continued from page 562.)

Connecting Rods.

THE H₂ section connecting rods and floating small-end bushes are similar to those used on the 160 h.p. engines except that the big-end bearings are 3.5 mm. shorter in the 8-cylinder engines. This reduction in the length of the big-end bearings has been effected by turning off the outer faces of the connecting-rod big-end brasses, evidently with the idea of reducing as much as possible the overall length of the engine.

Crankshaft.

¶ The exceptional length of the crankshaft and the disposition of the cranks is shown in Fig. 10. The crankshaft runs in 9 plain white metal bearings, and is fitted with a thrust ball-race at the front, at which

are cast integrally with the bottom half of the base-chamber, and, as usual, are secured by long bolts passing through the top half of the crank-chamber, and acting as the holding down bolts for the cylinders.

Following the usual Mercedes practice the crank webs are made slightly heavier in cross section towards the front end of the crankshaft. The external diameter of the crank pins is 55.9 mm., and the length of the crank pins 70 mm.

The decreasing internal diameters of the hollow crank pins and journals follow the Standard Mercedes practice, the holes bored in the rear end crank pins and journals being 40 mm., whereas the internal

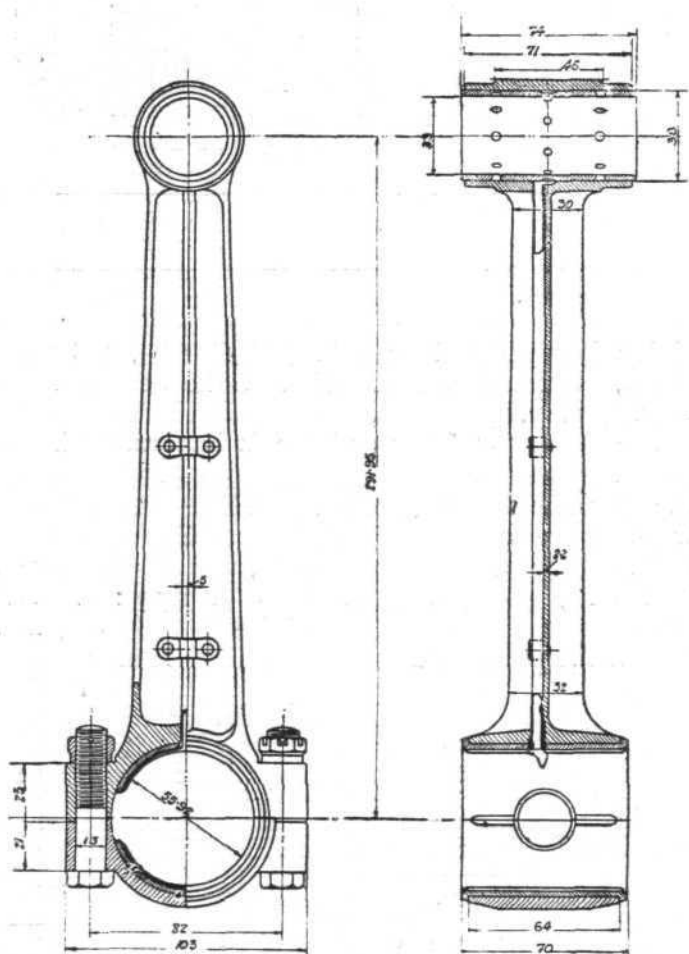


Fig. 8.

end the driving pinion is supported by a large ball-bearing, mounted on an extension of the driving pinion.

The firing sequence occurs alternately through the first and last sets of four cylinders, *i.e.*, 1, 3, 2, 4, 8, 6, 7, 5. It will be noticed that numbers 1 and 2 cranks are at 180° to each other, as are the cranks Nos. 7 and 8, whilst cranks 3 and 4, 5 and 6 are also set at 180° to each other respectively, but are at 90° to the front and rear pair of cranks.

The external diameter of all the journal bearings is 55.9 mm. The length of the front bearing, next to the reduction gear, is 90 mm. ; all the other journal bearings are 56 mm. long, with the exception of the rear bearing, which is 80 mm. long.

The bottom halves of the main bearing housings

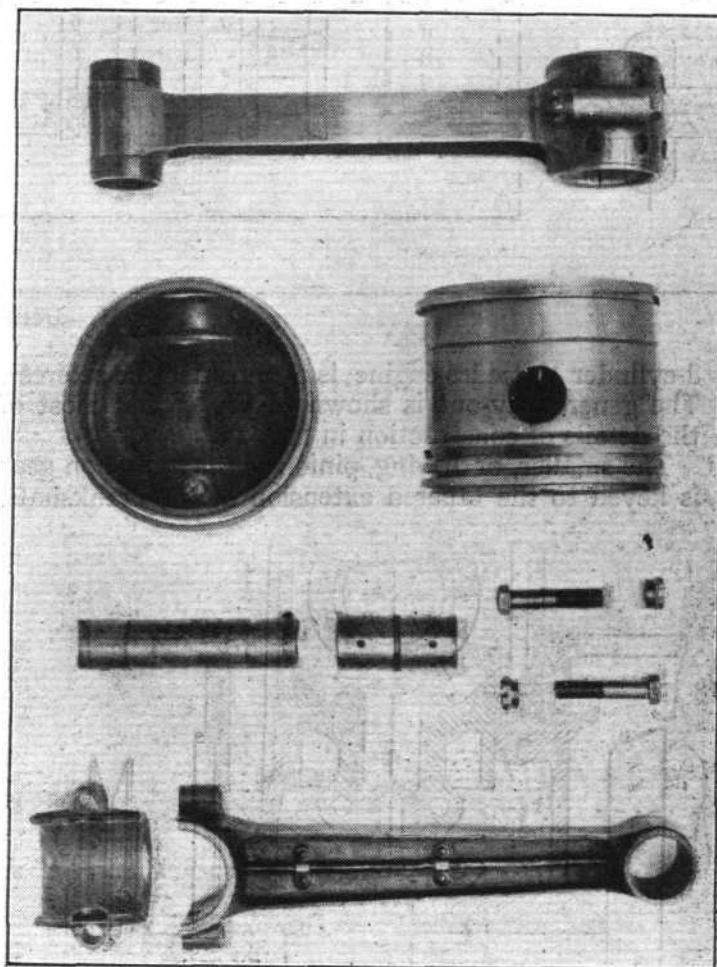


Fig. 9.

diameters of the crank pins and journals are gradually reduced throughout the length of the crankshaft to 22 mm. at the front end.

The thrust ball race at the front end of the crankshaft is situated directly behind the reduction gear pinion, and is held in position in the two halves of the crankchamber housing, the thrust race being located by a double flanged ring, and also by a split bush and gunmetal collar on the crankshaft.

Full details of the crankshaft design are given in Fig. 11.

Reduction Gear.

In view of the fact that this engine is apparently the first attempt to introduce an indirect propeller drive on any enemy aero-engine in service, the construction of the reduction gears, as fitted to the

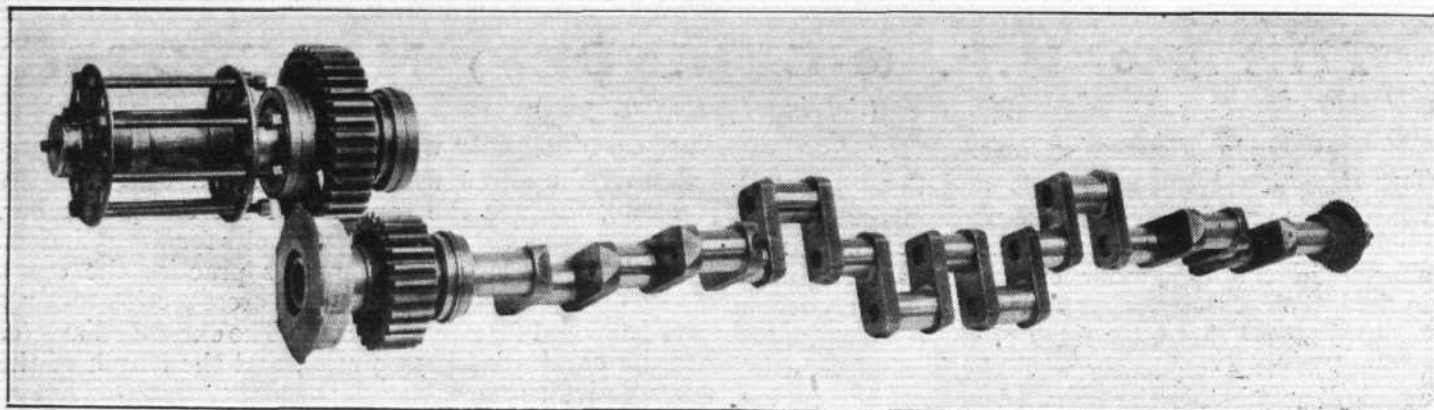


Fig. 10.—The crankshaft and reduction gears.

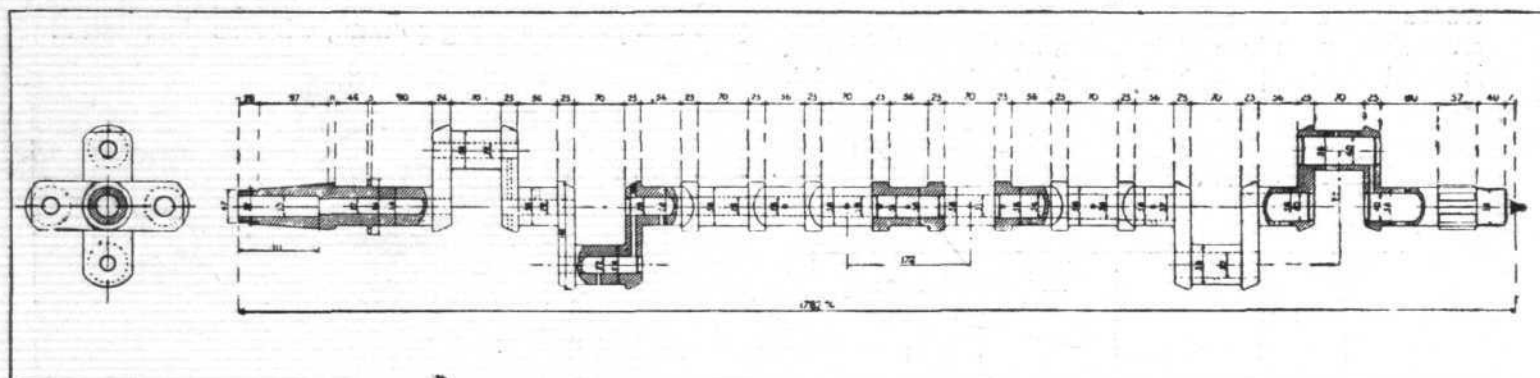


Fig. 11.—Details of crankshaft.

8-cylinder Mercedes engine, is of considerable interest. The general lay-out is shown in Fig. 3 and most of the details of construction in Fig. 13.

The smaller, or driving, pinion of the reduction gear is keyed to the tapered extension of the crankshaft,

pinion is supported on a large ball race, 148 mm. diam., carried on an extension of the boss in front of the pinion.

The larger, or driven, pinion is integral with the propeller shaft, and is machined from a solid forging, the gear wheel having holes drilled through the dished webs of the wheel to save weight. The number of teeth on the driving pinion is 26, and on the driven pinion 40, giving a speed ratio of 1.54 : 1. The diameter of the crank-shaft pinion is 168 mm., and that of the propeller shaft pinion is 250 mm.

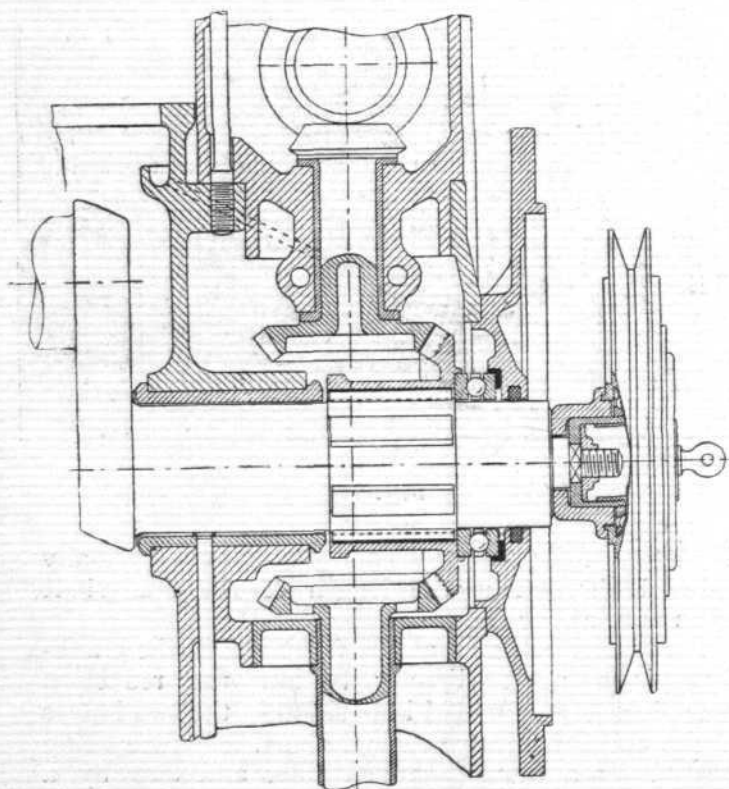


Fig. 12.—Arrangement of floating bevel gear and wireless clutch-pulley on rear end of crankshaft.

the key being fitted parallel to the taper on the crankshaft. The driving gear is held in position on the shaft by a large locking nut fixed by a grub-screw.

As already stated, the front end of the driving

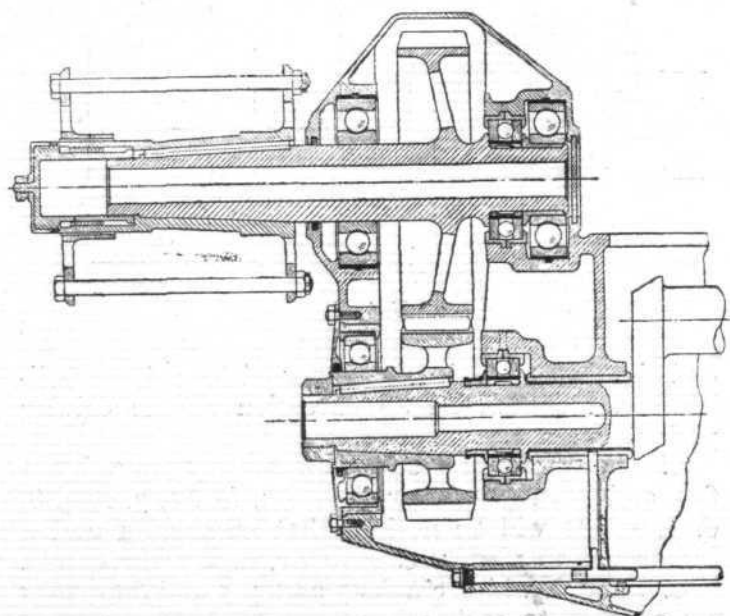


Fig. 13.—Arrangement of reduction gear and propeller hub.

The propeller shaft is mounted on two large ball bearings, and is provided with a thrust ball-race, which is located by a double flanged ring, registering with a groove cut in the bearing housing. The diameter of the front ball bearing of the propeller

shaft is 136 mm., and of the rear ball race 128 mm.

The method of mounting the rear ball-bearing, and also the two thrust-races, of the reduction gear shafts is unusual. The thrust ball-race behind the crankshaft pinion is mounted on the shaft on the two halves of a steel split-bush, over which a gunmetal collar fits tightly. The two rings of the thrust race fit on the outside of the gunmetal collar. The thrust race is then located by a second split bush of steel, the halves of which are also held together by a collar, the split bush being in turn located by a shoulder machined on the crank-shaft. The rear ball-bearing on the propeller shaft, with its thrust race, is mounted in a similar manner, as shown in Fig. 13.

The reduction gear bearings are enclosed in gun-metal locating bushes fitting into recesses machined in the aluminium casing, which forms an extension of



"X 96" Raid.

THE following note was officially issued on May 22nd:—

"Police reports show that the total casualties so far ascertained as having been caused by the air raid on Sunday night in all districts visited by hostile aeroplanes are as follows: Killed, 44; injured, 179."

Superiority in the Air.

In an interview with the London representative of the *Petit Parisien*, Sir William Weir, the Secretary of State for the Royal Air Force, after paying an eloquent tribute to France, "our great ancestor in the domain of the air," declares that never had the situation given greater cause for hope. In all the Allied countries production was being accelerated in a continuous manner. In England there was not a workman, not a member of the Staff, who was not working day and night with the sole thought of surpassing the Germans.

Questioned as to the reality of the Allies' superiority in the air, the Air Minister replied:—

"For the moment, yes, perhaps we do have it, and we shall continue to have it if we know how to keep it—so long as we stick to our work." Sir William Weir does not agree with the views of M. Painlevé on the standardisation of aircraft.

"We must continue to perfect every type of machine, whether observation, registering, bombing, or chasing 'planes," he said.

With regard to unity of command in Inter-Allied aviation, he feared this would meet with many practical difficulties. It was, moreover, more or less realised already by the military unity of command, since all squadrons are attached to established divisions. On the representative of the *Petit Parisien* asking what kind of aerial warfare was to be preferred, Sir William Weir replied, "All. On their combined efforts depends success."

Fighting in a Burning Machine.

It must be a rare experience for a pilot to be able to put out the flames on his machine and continue to fight. In a despatch to the *Daily Mail* the other day Mr. Hamilton Fyfe says that on May 20th a squadron flying high was attacked by a number of Germans. Two of our men were specially singled out. One of them, whom I will call A, found that his machine was on fire. He dived 13,000 ft. intending to land if need be, but before he got near the ground, he managed to get the flames under.

His comrade B, coming down to see if he needed help, was fiercely attacked, and suffered so badly that his machine began to fall to pieces. He succeeded in frightening an enemy pilot away from A, but no sooner had he done this than he was again in grips with another German. This time A was able to come to his assistance, although A's engine was boiling and although he had only his Lewis gun in use with the sight fogged.

He drove the Boche away, and then both the Englishmen planned downwards, for they were now over our own territory. B's machine was still disintegrating, to use the technical term in vogue among the Royal Air Force, and he had a bad landing. His machine caught fire and was destroyed, but neither of our airmen was wounded or injured.

Escaped French Aviator Honoured.

M. CLEMENCEAU has handed the Cross of the Legion of Honour to the aviator Lieut. de Villelenne, who after four perilous attempts succeeded in escaping from Germany, having made good the escape of two other well-known airmen whose return to France he considered of greater value than his own.

the crank-chamber, and the two halves of the casing are held in position by six long bolts, passing through the two halves of the propeller shaft bearing housings.

The propeller hub is mounted on the tapered extension of the air screw shaft extension, and is secured as shown by a key, and also by the usual Mercedes propeller hub locking nut, which carries a flanged locking plate on a stud in front of the nut. This flanged plate, or cup, is provided with notches, cut on the inside of the flange, registering with the flats of the hub locking nut, and also with the serrations cut on the outer surface of the propeller hub, on to which the front flange of the hub fits.

A conical metal cap was fitted in front of the propeller hub according to the report on the captured aeroplane, photographs of which are reproduced at the end of this report.

(To be continued.)



The Importance of Aerial Superiority.

THAT the effective air work of the Allies is the great factor in delaying the new German offensive is emphasised by the views of two prominent French experts. Thus Lieut.-Col. Rousset, writing in *La Liberté*, says:—

"The unusual delay in the opening of the German Western offensive can only be explained by the disorder caused to their plans by the superiority acquired by the aviation service of the Allies. This service is effectively preparing a dislocation of the equilibrium of the enemy land forces, so that it is true to say, without being too absolute in using such words, that the Fifth Arm is attaining increasing importance in the solution of the conflict."

Also, Gen. Malterre, in an interview with a representative of the *Matin*, points out that an intensive bombardment continuing day and night was the real objective of aviation. "This aerial strategy," Gen. Malterre continued, "has far-reaching influences and must be taken into consideration in the decisions of the Allied Governments and Inter-Allied High Command. We are no longer short of material. We have a magnificent phalanx of bombarding machines. Nothing more was lacking but the right mentality for an offensive. This mentality exists. Our enemies are very near defeat."

Testimony from the Enemy.

"ONE of the most striking features of the present phase of the war is the superior skill of our airmen," says Reuter's Special Correspondent with the British Army. He states that "an officer pilot who was lately taken prisoner says that this superiority is fully realised throughout the German army, and is regarded with grave concern. He added that the moral of the enemy air service has become lower than it has ever been, and the quality of the material supplied often shows great deterioration. Many new machines are built of tubing and wire of poor quality, and increasingly frequent mishaps are the result. Damaged machines are sent back into Germany whenever practicable to be patched up, and used in the instructional schools, and this too is a cause of accidents. This pilot doubted whether 30 per cent. of the aspirants who enter the schools ever get to the Front, and he says that so great is the shortage of officers that private soldiers are being trained as observers."

Famous French Pilots Honoured.

SUB-LIEUTENANT FONCK, the famous French pilot, has been specially promoted to Lieutenant, and Lieutenant Nungesser, who has brought down 36 enemy aeroplanes, has been made an officer of the Legion of Honour.

A New French "Ace."

SUB-LIEUTENANT NOGUES was taken prisoner in April, 1917, after he had gained two victories in the air. Twenty days later he escaped from Germany and returned to his squadron. Last August he was wounded, but he returned to the front again at the beginning of this year, and since then has gained three more victories.

Two Months' Air Losses.

ACCORDING to the *Matin*, during March and April the Germans lost 57 aeroplanes within the French lines, 127 were driven to earth in view of the French infantry, and 138 were destroyed within enemy territory, a total of 322, as against 96 French machines lost, of which 53 fell in the enemy lines, 22 were destroyed in the French lines, and 21 were seriously damaged.

AIRISMS

FROM THE FOUR WINDS

A FORTNIGHT ago we announced that the custom of newspapers being on "Sale or Return" was, under powers of DORA, to be abolished on June 10th "for the duration" by the Government. A reprieve is now announced until June 24th, after which date all readers of newspapers, whether daily or weekly, must place their orders definitely in advance with their newsagents or at the bookstalls, or as we have already pointed out, alternatively, order their papers direct from the publishers. This applies, of course, to "FLIGHT," and as from and including our issue of June 27th, therefore, readers must arrange that their orders are placed well in advance, as only the quantity of "FLIGHT" that is actually ordered beforehand will be printed, and those who fail so to place their instructions with newsagents or direct with the publishers at 36, Great Queen Street, Kingsway, will only have themselves to blame when they find there is no copy of "FLIGHT" available for them. The direct rates of subscription will be found on the last page of Editorial matter in this and any issue of "FLIGHT."

UNDER the new Military Service Act there must necessarily arise many cases of hardship, and at times, no doubt, even of tragedy. It rests with those who administer the Act to, as far as is possible, mete out justice, while seeing the country is not in the aggregate jeopardised. In the bitterness of the first effect of this new call upon men of 45 and above, there is in some cases a great deal of acute feeling against everything and everybody generally, and against all officialdom in particular. In this way injustice is likely equally to result, often in such a form as to render it difficult to straighten out. Therefore it is good reading to find the complaint of an Ilford resident who, finding himself liable to be called up under the new Act, wrote to the Minister of National Service, Sir Auckland Geddes, complaining that "men of 45 are being forced to leave all they have to become soldiers at 8d. a day, while you, a younger man, remain in your London office taking £10 a day of the country's money."

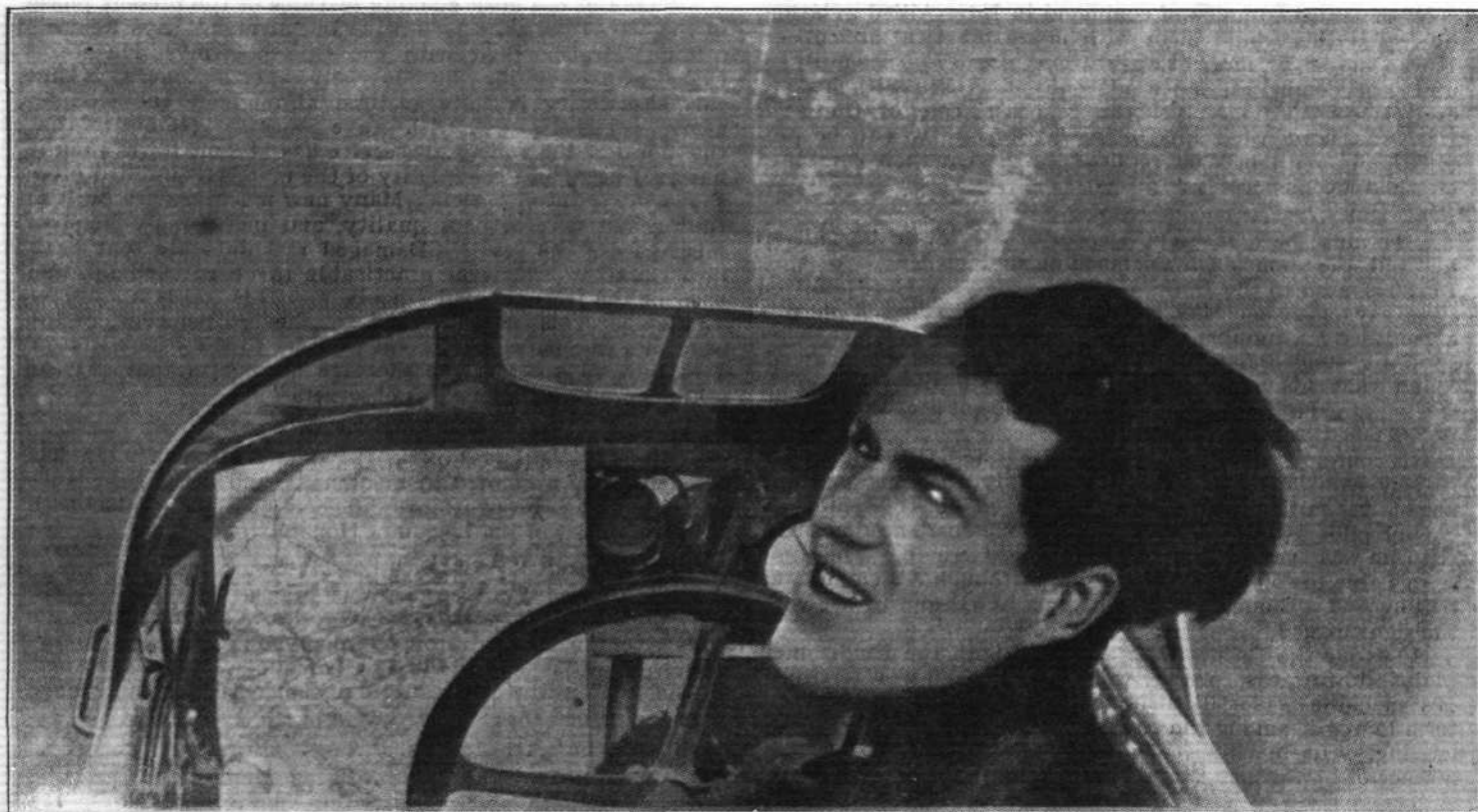
Now, no more strenuous worker than Sir Auckland exists for getting the best, tempered with discretion, out of the raw human material for winning the war, and therefore there is good reading, by reason of the early opportunity which

it has given of forthwith laying this falsehood by the heels in the following quick reply from Sir Auckland's private secretary: "Sir Auckland Geddes desires me to assure you that he does not get the sum of £10 per diem, or anything approaching it. He thinks you may like to know that he, too, has served as a private at the rate of 1s. a day; that he joined the Army in the early days of the war, has been in France, and is now only in a civilian position as he is unfit for further active service as the result of injuries received by him in France. Perhaps I may add that Sir Auckland also served in the South African war."

WOULD that the country had a few more Sir Aucklands to help carry on in like manner to the Minister for National Service.

As to the actual effect of our systematic air tactics upon the enemy, opinions may differ, and possibly some of the more glowing and picturesque accounts may be treated as "suspect," or at least biased. But in the result there can be little question the aerial arm is more and more nearing that point when it may be fairly claimed that the long and oft-repeated prophecy that this war will be decided in the air, is being fulfilled. And it's not the Allies and their friends only who are thus thinking things out. Hear what, under the heading, "The Guard across the Avre" the correspondent of the *Frankfurter Zeitung* on the Western Front says upon this phase of activities, in conclusion to an impressionist account of the forced marches that brought Hutier's Army into the line two months ago:—

"That was the advance. But this advance we knew already from 1914. We knew it in the East. But what we do not know in the East is the enemy airmen. With every kilometre further forward they become more important. They are not reconnoitring, they are attacking. They come in whole squadrons; the bombs whine through the air and burst; the machine-guns spray up and down the crowded roads; and the columns are without any cover beyond only the roadside ditch. The plaguey fellows are driven off, but they are soon back again with new bombs and fresh ammunition. Our chasing echelons cannot be everywhere at once. And so it goes on day and night. No



(La Guerre Aérienne.)

A FRENCH FIGHTER DURING A BOMBARDMENT.—L'Adjutant C— "snapped" by his gunner during flight.

quiet hour, no sheltering billet, and with the cold March rain on top of it all, no dry stitch on one's whole body."

HITHERTO we have been familiar with the game of "golf," "clock golf" and any other old golf, but as usual it rests with America to really do the thing on the grand scale. According to the correspondent of the *New York World* at Wichita Falls, Texas, "Aeroplane Golf" is the latest form of pastime combined with practice, indulged in by the local aerial brigade. It appears that an aerial golf field that has a circuit of 180 miles has been laid out by the aviators of Call Field, near the Falls, upon which this new sport is indulged in every day by many of the expert fliers. It is a nine-hole course.

The game is played in singles only, and with a Standard or Curtiss biplane instead of clubs and a gutta-percha ball, and elements of hide and seek are combined with the principles of golf.

The "holes" are certain fields, in which are mail boxes where the fliers must deposit a slip of paper bearing the time they reached the hole and their names, after making a landing. They again get in the machine and start up, driving for the next "hole," and the same process is repeated until the entire course has been made. The course is often completed in three hours or less.

The cadets are given compass bearings and the course to each hole on starting out, and have to find their way from that. No maps are allowed. It is an interesting game and a valuable test as well.

We suppose there'll now be somebody wanting an 18-hole aerial golf course.

GERMAN music up-to-date. A piano-tuner, with 20 years' experience, informs "The Londoner" that there are two distinct notes given off by the Gotha, which differ from the sound of our own planes. In Sunday's raid one could plainly hear the droning Englishmen, who were quite monotonous (musically speaking) in comparison. The notes from the Gotha are in the same relation as the sound obtained from striking the notes D and A, allowing a smooth and sustained A with a slow tremolo on the D. Of course, both notes would be sounded together. These notes have been noticed in all night raids, and cannot be confused with the sound of our own planes.

VERY simple, no doubt, under normal running, but not quite such an easy matter when the machines get into difficulties. Take the following case of one of the Gothas which came to grief after being attacked during the Whit Sunday night raid. This particular Gotha, according to report, ended its career in a village wheat-field after a collision with a big elm tree. The smash occurred about midnight. The raider was alone, and going seaward, and as banks of thin fog were rolling inland it is believed that the pilot had lost his bearings as well as having mechanical trouble.

According to an eye-witness, "for a long time before it came down the tremendous noise of its engines led people to think it must be a Zeppelin. The noise decreased as the machine went out to sea, but swelled later as it came back to land, and soon became louder than ever. The raider passed over my house like an enormous black bat and landed on a farm about two miles away." Thus attempting to land in a wheat-field she ended her career in a collision with the big elm tree.

ASSOCIATED with the above raid, the *locale* of which from the description we seem to have personal knowledge of, was a somewhat suggestive incident. On the lame duck's erratic journey from the sea landwards, the machine, no doubt for the purpose of discovering some safe landing-place, used a searchlight several times; then the machine suddenly for a matter of two or three seconds was outlined in red lights, to be followed a minute later by being outlined in green lights, "à la stunting" of Hendon remembrance. Presently—in all only a matter of quarter or half a minute—the raider had got so low that, by its searchlight, the pilot evidently discovered that he was nearly on top of some high elms with no clearance behind, but was able to swoop his machine round at right angles just in time to keep clear, sending up at the same time an S.O.S. signal of a red and a green Very light, as she, with coughing engines, made the best way she could to clearer ground a few fields away.

Now the suggestive point of all this is (there is an aerodrome within hail of this place): were these signals being sent out with knowledge of the adjacent 'drome to attract a reply for safe emergency landing. The occupants without

question were well aware of their whereabouts, as one of the survivors, from a map in his possession, denoted the exact spot where they had come down.

THE suspicion not unnaturally arises are these carefully elaborated signals on German machines part of some subtle form of kultur which may be calculated to "draw" the answering signal from our own aerodromes (under the impression that it is one of our own machines in distress) so as to ensure the Hun raider getting rid with certain effect of a real good basketful of eggs? Or was it merely the result of an optical illusion brought about by the reflection on the aeroplane of Very lights previously thrown up by the raider, and obscured by the machine itself from the watcher on *terra firma*?

It is worthy of special note that last week the arrival of medical assistance by aeroplane was a feature of an aviation accident at a North-East coast town. A two-seater was forced to land, and the occupants had a narrow escape. In response to a telephone message another machine, with a doctor as passenger, alighted in the vicinity, and the injured airman received attention before being removed.

Apropos the German "Gotha music," music of other kinds bracketed with the air-raiders is referred to in the *Daily Chronicle* "Office Window." One would expect, says our contemporary, our little brown owls, whose hearing is as wonderful as their sight, to be the first to detect the sound of coming planes, but on Sunday a company of peacocks had it. During the silence which followed the warning, they raised ear-splitting shrieks, like Chinese fiddles driven by machinery. The toot-chorus of the owls came later, and dogs barked after an appreciable interval. Then we heard the drone of engines. But cats were the most insolent: they fought during the heaviest phase of the barrage, to an accompaniment of "language" which not even the guns could drown.

ALTHOUGH the Government will not "bemean itself" (or is it, politically, dare not) by instituting premium bonds, and thereby pulling in much war funds, there are others who are more appreciative of this form of sport when there is a chance of good work resulting. By way of instance, Reading way, in order to raise funds for the Prisoners of War Fund being gotten together by the local R.A.F. contingent, a "draw" has been organised to take place on June 1st for a motor-cycle as a prize. In consequence much cash has been very readily forthcoming, all of which will be available for the excellent object for which it has been subscribed, as the gross sum collected will be handed over and no expenses whatever deducted. This is as it should be, and we offer our congratulations to the organisers accordingly. Next week, for the information of those who *hope* to secure the motor-cycle, we propose publishing the winning ticket number.



The moonlight raider.

THE National Sailors' and Firemen's Union have added another three months (specially ear-marked on account of the recent hospital bombing iniquity of the bestial Huns) to their post-war boycott of all that is German.

WHAT this latest iniquity spells may, in a measure, be gauged from a statement in "A Londoner's Diary" to the effect that the bombed British hospital contained 4,000 patients, 1,500 of whom became fresh casualties under the bombardment. These casualties included 45 doctors, nurses and orderlies killed. This estimate, however, must be very materially discounted after Mr. Bonar Law's statement on Tuesday that the casualties were 300 "hospital cases" only.

OUR only possible reply is, so far as military needs allow, the bombing of Hun towns, Rhineland and otherwise, continuously and furiously, so that in sheer desperation the inhabitants may visit their wrath upon those who have willed such "kultur."

OUR LATTER DAY HOMERS.

(Horatius Botherem.)

"Damn the Kaiser!"

It is with a full sense of my awful responsibility before God and man that I pen these words. I know, no man better, what the consequences may be, how drastic and far-reaching. Heavy and terrible will be the price that the hordes of the Hun intend to exact for the simple phrase I have just written, but I stand by it.

Britons, are you with me?

You may have noticed that the war is not over yet. Christmas has come, and passed. *But I still trust Haig.* Therefore you may take it from me, *all is well!*

And I will tell you something. Germany intends mischief. Germany does not love us. On the blood-spattered fields of Flanders her fell minions are working busily, unceasingly, for the wrecking of this fair land.

Watch Germany!

Yet all is well. The end is not yet, but the pattern of our destiny is being spun out on the mighty looms of Time.

Reverently and with bowed head I declare that I will stand behind the British Empire. If she will but endure, our sea-girt Isle shall have my unflinching support until the last Hun lies howling in the dust.

(Next week another splendid spasm from Mr. Botherem.)

(Mr. C. Allblue.)

One hears it averred that certain lewd fellows of the baser sort (to wit, British "workmen") have seen fit at this crucial

Mentioned for Mahsud Operations.

It was announced in a supplement to the *London Gazette* on May 18th that the Government of India has forwarded the following list of officers and non-commissioned officers whose names have been brought to notice by Lieut.-General Sir A. A. Barrett, K.C.B., K.C.S.I., K.C.V.O., for valuable services rendered during the operations against the Mahsuds, March-August, 1917:—

Royal Air Force (Military Wing.)

Lieut. (Temp. Capt.) H. A. Fletcher; 2nd Lieut. E. R. A. Robinson; No. 1555, Sergt. (now Flight-Lieut.) J. New,

Medal for Gallant Rescue.

At the monthly meeting of the Royal Humane Society a medal was awarded to Flight Sub-Lieut. Douglas B. G. Francis, R.N.A.S., who, although himself badly injured, kept his mechanic afloat until help arrived when their machine fell from a height of 400 feet into the Humber on January 13th.

A Woman's Record Flight.

MISS KATHERINE STINSON, according to a message from New York on May 24th, broke the American non-stop record in an attempt to fly from Chicago to New York. Owing to shortage of gasoline she was forced to descend at Bing-hampton. She flew 783 miles in ten hours.

Changes in U.S. Air Service.

At last the United States has a separate Air Service, and one of President Wilson's first acts under the Overman Bill which gives him power to transfer the functions of one Government Department to another, was to separate the Air Service from the Signal Corps. In future the duties of the Chief Signal Officer shall be limited to such duties as existed before aeronautics became an adjunct of the signal service. Also, as briefly indicated in our last issue, a new department has been created for the production of aircraft. The Bureau of Aircraft Production, created under Mr. Ryan, have full charge of construction, and the Director of Military Aeronautics, General William Kenly, is appointed head of

hour of our country's fate to declare a strike. Should any one of them, reading these lines, feel himself aggrieved thereby, we recommend him to the perusal of *Comic Cuts* or some such innocuous periodical. There are not enough copies of the "Aerodromes" to go round. *Margeritas ante porcos.* Or, following the example of dear old Sidney Smith, who avowed that he preferred the third book of Euclid to the others, as it was "not so passionate," they might alternatively seek to fill their vacuous skulls, or even take an interest in their job. As Mr. Kipling's unforgettable House Master, King (to whom I am privily compared by my friends), might have said, *Cucullus non facit monachum* (the cowl does not make the monk: my apologies to those who, having received a public school education, stand in no need of enlightenment, but one has to consider the herd) and a certain facility with the file does not even, in these days, constitute what, when I was a fitter at the bench, we used to consider a workman.

Let me be brief.

(Continues to be brief for five pages.)

(Mr. Deadly Bore.)

We feel no remorse or pity in stating anew that the success of our arms in France is due in no small measure to the daring of our intrepid airmen. We have said it before; we shall say it again. *Ca saut aux yeux.*

But it should ever be born in mind that the efforts of these gallant "fellows" (if so slangy an expression may be permitted) is inseparably and indissolubly connected with efforts which are put forth by those who purvey those commodities indispensable to the effective waging of war.

In fact, the workers.

("Boy, chuck over the scissors and that paste pot").

Our apologies are due to our readers for setting out anew Prof. Pancake's delicate and luminous summing up of the case, but we feel that it is particularly apposite at the present juncture.

The professor says, in part:—

"If a herring and a-half costs three ha'pence, and the specific gravity of Government beer is .000000329, then—"

$$\frac{x - \frac{dnzhK}{a + dnzhK}}{a + dnzhK} = \frac{\lambda an^2zhL}{1 - K'} = \frac{1 - K'}{1 - K'}$$

"To arrive at the state of the workman's mentality (which we will call "x," that being the sign usually accepted for an unknown quantity) as a consequence of these phenomena, whether objective or subjective, let us premise . . ."

(Continues nebulously.)

B.

the new Army Air Service Corps, and is responsible for the actual operation, including the training of airmen and the transport and operation of flying machines. The Aircraft Board remains in existence merely in an advisory capacity, without power to limit or affect the work either of Mr. Ryan or General Kenly. Mr. Hughes, after conference with the Attorney-General, has decided to begin an investigation into the aircraft charges immediately. The proceedings, necessarily in secret, will be in the nature of a Grand Jury enquiry.

Americans Help to Protect Paris.

THE Paris authorities have accepted the offer of the American Aviation Command in France to provide an American squadron to participate in the defence of the capital. The squadron will be composed of pilots chosen from among the most expert.

An International Aerial Army.

THE Parliamentary Aviation Group, of which M. Painlevé has just been elected President, has passed the following resolution:—

The Aviation Group, believing that the operations of aerial warfare will play a decisive rôle in obtaining victory, and believing that the Allies have at their disposal sufficient material to enable them to obtain a crushing superiority in the air, expresses the wish that the Government shall, firstly, form, in agreement with our Allies, an aerial army, to which a clearly defined plan of campaign shall be assigned; secondly, centralise the administration of the Air Service in order to speed up to the utmost the production of material for aviation; and, thirdly, organise rationally the recruiting formation and training of the personnel of the Air Force, and assure for it the status of an arm composed of picked men.

M. Painlevé has recently written an article in the *Petit Parisien* urging "the co-ordination of effort" in air warfare, in which he says "Let the Allies pool their knowledge, their information, and inventive faculties, as they have done their corn and their gold."

Personals

Casualties.

Lieutenant GEORGE MUSGROVE CARTMEL, R.A.F. reported missing on April 6th and now officially reported to have been killed in action on that day, aged 19, was the eldest son of Mr. G. E. Cartmel, coroner for Westmorland, and Mrs. Cartmel, of The Meadows, Kendal. He was educated at Rossall, and joined the R.N.A.S. from the school O.T.C. in June of last year. After undergoing training in England and France, he was gazetted flight sub-lieutenant in the Royal Navy in December of last year. He was wounded in action on March 16th, and had only just returned to duty when he was killed. He was a good all-round athlete, and won his colours at school for both cricket and football.

Lieutenant FREDERICK VINCENT HALL, R.A.F. (formerly Sub-Lieutenant R.N.A.S.), who was killed on active service on May 15th, aged 20, was the only child of Mr. and Mrs. F. W. Hall, of Elmcroft, Muswell Hill Road, N., and 89, Charterhouse Street, E.C. He was awarded a medal by the citizens of Dunkerque for bravery in defending the town from hostile aircraft on May 2nd, 1917, and was wounded on May 23rd, 1917, while flying over the enemy lines.

Lieutenant FRANCIS L. MOND, R.F.A. and R.A.F., who was killed in an air fight on May 15th, aged 22, was the eldest son of Mr. and Mrs. Emile Mond, of 22, Hyde Park Square, and Grey Friars, Storrington, and nephew of Sir Alfred Mond, First Commissioner of Works. He was educated at Rugby and Cambridge, and, having received his commission in the Territorial Artillery in June, 1914, volunteered for service overseas on the outbreak of war. In February, 1915, he joined the Royal Flying Corps, and in the following summer was employed on active service in France. Later he returned to England suffering from shock and concussion, resulting from a fall with his machine. He was in France again in January, 1916, but later on, being classed as temporarily "unfit for flying," he was attached to the R.F.C. staff at home for a period of eighteen months, but returned to France in March of this year. On May 15th, while flying over the enemy lines Lieutenant Mond was attacked by several enemy scouting machines, and both he and his observer were killed during the action. Their bodies were brought in at great personal risk by an officer in the front line who had witnessed the fight.

Lieutenant EDWARD PERCIVAL MORGAN, R.A.F., who died on May 23rd of wounds received in action the same day, was the son of E. Strachan-Morgan, of 56, Boundary Road, W.

Lieutenant CHARLES DOUGLAS WELLS, M.C., R.A.F., who was killed in action on May 16th, aged 21, was the only son of C. H. and Mrs. Wells, The Manor House, Hempstead, Norfolk.

Lieutenant COLIN CORRY BEVINGTON, R.A.F., who was killed on May 22nd, while flying in Yorkshire, was the youngest son of Alex. and Margaret Bevington, of Silverwood, Pyrford, near Woking. He was in his 19th year.

Captain HUGH FANSHAW GLANVILLE, R.A.F., who died at the V.A.D. Hospital at Gullane, E. Lothian, on May 24th, as the result of an accident while flying the previous day, was the younger son of the Rev. O. F. Glanville, South Brent, Devon, and husband of B. G. Glanville.

Lieutenant ERNEST TERENCE HEARD, who was fatally injured on May 17th in a flying accident in Essex, aged 28, was the only son of Mrs. Heard, of 31 Dorset Square, N.W., and the late Edward Heard. He was educated at Thanet College, Margate, and afterwards went to Bahr-el-Ghazal, Southern Sudan, in the employ of the Kordofan Trading Company, and later of the Sudanese Government. At the outbreak of war he joined the 2nd King Edward's Horse as a trooper, and went to France on May 2nd, 1915, where he was made corporal for gallant conduct in action. After returning to England he joined the R.F.C. in February, 1917, and took his pilot's wings in August.

Lieutenant FRANK MAGENS CAULFEILD HOUGHTON, R.A.F., who was accidentally killed while flying on May 6th, was the eldest son of Mr. Frank Edwin Caulfeild Houghton, of the Old Hall, Dorrington, Shrewsbury, was born in 1895, and was educated at Magdalen College School, Oxford, and Denstone College, Staffs. Leaving school on August 1st, 1914, he received his first commission in the Shropshire Light Infantry the following September, afterwards transferring to the Army Cyclist Corps, and in May, 1916, he became an

observer in the R.A.F., in which force he served continuously for 18 months in France, obtaining his wings in 1917. He was the originator and promoter of the All-Khaki motor-cycle race meetings at Brooklands in 1915.

Lieutenant-Colonel DOUGLAS HYDE THOMSON, R.A.F., formerly Royal Navy, who was killed on May 21st, while flying in Kent, was the second son of Mr. and Mrs. R. D. Thomson, The Pool House, Groby, near Leicester.

Lieutenant F. P. SLEIGH LACEY, A.S.C., attached R.A.F., died on March 29th in hospital, of pleuro-pneumonia, at the age of 26.

Major H. W. VON POELLNITZ, R.A.F. and Lincolnshire Regiment, only child of Baron and Baroness Poellnitz, and grandson of the late Sir Walter Elliott, of Wolfelee, Hawick, was educated at Repton, where he was in the shooting team for four years and captain for two years. From there he passed into Sandhurst in 1910, where he was captain of the cricket eleven. He received his commission in 1911 in the 2nd Lincolnshire Regiment, and went to Gibraltar in January, 1912, and to Bermuda in January, 1914. In both these places his company won the Rifle Cup. He went to France in November, 1914, was wounded in April, 1915, and, on his recovery, joined the R.F.C. in October. He obtained his wings on January 20, 1916, and went to France in May. He flew over the Somme battlefields from July to April 18, 1917, obtained his flight in October, 1916, and was made major and squadron commander on July 2nd, 1917. He took his squadron to another front last January. On May 10th he met with a motor accident, and died on the following day. He was a good sportsman all round, an excellent rider and shot, and good at all games.

Second Lieutenant HARRY DENNIS PRESTON, R.A.F., who was killed whilst flying in Wiltshire on May 14th, aged 22, was the youngest son of Robert K. Preston, of Chicago.

Lieutenant CECIL MARTIN SANKEY, M.C., The Buffs, attached R.A.F., who was accidentally killed while flying at Northolt on May 15th, at the age of 21, was the only son of Major and Mrs. W. Sankey, of Wouldhams, 7, Tring Avenue, Ealing. He was educated first at Dumption House, Broadstairs, and later at Westminster School, where he was in the O.T.C. He received a commission in Queen Victoria's Rifles before he reached the age of 18. After serving in that regiment for several months, he received from the Headmaster of Westminster (Dr. Gow), in January, 1916, a nomination to Sandhurst. There he reached the rank of sergeant in the following April, and passed out in August, being then gazetted to The Buffs (East Kent Regiment). He went to the front in September, 1916, and on January 27th, 1917, was awarded the Military Cross for conspicuous gallantry and devotion to duty while leading his men against the enemy at the battle of Loos, receiving the decoration from the King some months later at Buckingham Palace. Last December he was transferred to the R.A.F., and only about a fortnight ago qualified as pilot, and received his certificate and wings.

Captain GEORGE EDWIN THOMSON, D.S.O., M.C., R.A.F., who was accidentally killed while flying in England on May 23rd, in his 21st year, was the only son of Mr. James Thomson, of Rangoon, Burma. He was educated at Glenalmond and Glasgow University, where he was studying with a view to a Civil Service appointment. On the outbreak of war he was gazetted second lieutenant in the K.O.S.B., and in 1916 he became attached to the R.F.C. In August, 1917, he went out to France, and in recognition of his services was appointed flight commander in November of the same year. In March, 1918, Captain Thomson returned to England, having brought down 21 German aeroplanes, and having throughout displayed exceptional gallantry on patrol. He was awarded the M.C. during the same month, and in April he won the D.S.O. In May he was appointed second in command of a T.D.S., and only a few weeks later he met his death on a cross-country flight. Captain Thomson was a keen airman, and an excellent Rugby player and swimmer.

Second Lieutenant ERIC PERCY JOHNSTONE TOUCHE, R.A.F., who was killed in an aeroplane accident on May 17th, aged 21, was the only son of Mr. Percy Touche, of Simondium, South Africa, and grandson of the late Edward Touche, M.D., Staff Surgeon, 92nd and 83rd Regiments, who rendered distinguished service in the Indian Mutiny, and a great-grandson of the Rev. John Edward Touch, formerly minister of Kinnoul, Perthshire, another of whose sons was the late

General John Gray Touch. (The name which, in Scottish usage, had become Touch was restored to its original spelling of Touche by Royal Licence.) Eric Touche volunteered for service in South Africa in 1914, when in his 18th year. He served first in Egypt, then in France, where he was wounded in the head. In March, 1917, he received a commission in the 3rd Essex Regiment, and returned to France, but was invalided home with trench fever in June, 1917, and volunteered for the Air Service in October, 1917. He had just qualified as pilot and received his wings.

Lieutenant BRYAN FRANK LAWSON YEOMAN, who was accidentally killed while flying on May 11th in his 22nd year, was the second son of Captain E. W. Yeoman, of "Lauriston," Lee. He was educated at Highfield College, Leigh-on-Sea. On August 5th, 1914, he joined the 4th London Howitzer Brigade, and received his commission in the London Regiment in the following June. He served in Gallipoli, Egypt, and France, being wounded three times. Last September he transferred to the Royal Flying Corps.

Married.

Captain H. L'E. TYNDALE-BISCOE, R.A.F., was married on May 25th, at Christ's Church, Redcar, to ELSIE MAY, eldest daughter of Major and Mrs. CRONE.

Lieutenant ROWLAND VARLEY, R.A.F., second son of Mrs. K. Varley, of Wolverhampton, was married on May 10th, at Wolverhampton, to LEENE JOSEPHINE, second daughter of Mr. and Mrs. J. GOUGH, of Southampton.

Captain HERBERT LEE WOOD, R.A.F., eldest son of Mr. and Mrs. Wood, Manchester, was married on May 11th, at St. Paul's Church, Deptford, to NORA FRANCES AMOS, eldest daughter of the Rev. and Mrs. Amos, St. Paul's House, Deptford.

To be Married.

The marriage will take place on Saturday, June 1st, at the Chapel Royal, Savoy, at 2, of Lieutenant S. HOWARD

ELLIS, Northumberland Fusiliers and R.A.F., eldest son of Mr. Howard Ellis, of Auckland, New Zealand, and MARY, daughter of the Hon. Sir Thomas MACKENZIE, K.C.M.G., High Commissioner for New Zealand, and Lady Mackenzie.

The marriage arranged between Mr. ROBERT C. GRAHAM, R.A.F., and Miss FLORENCE C. GASKELL will take place quietly at St. Matthew's Church, West Kensington, on June 4th, at 1 p.m.

The engagement is announced between Lieutenant J. A. B. LANE, Hussars attached R.F.C., son of the late Mr. F. G. Lane, of the Stock Exchange, and Mrs. Lane, of 2, Weymouth Street, W., and KATHLEEN HILL, only daughter of Mr. and Mrs. F. H. Hill, of Ilkley and Bradford.

The marriage arranged between Lieutenant PERCY S. LAUGHTON, North Staffordshire Regt., attached R.A.F. surviving son of Mrs. E. J. Laughton, and GRACE MARGUERITE MARSH, youngest daughter of Mrs. G. Marsh, will take place at St. Mary's Church, Balham, on Wednesday, June 5th, at 2 p.m.

The marriage arranged between Major OLIVER VILLIERS, D.S.O., R.A.F., son of the late Rev. H. M. Villiers, and of Mrs. Villiers, of 7, Queen's Gardens, Lancaster Gate, and ALEEN JUDITH, second daughter of the Rev. and Mrs. H. V. HEBER PERCY, of Leasingham Rectory, Sleaford, Lincs, will take place at St. Paul's, Knightsbridge, on July 6th, at 2 p.m.

Items.

It was announced in the Court Circular of May 22nd, that Major-General F. H. SYKES (Chief of the Air Staff, Royal Air Force) had the honour of being received by the King.

The Lord ROTHERMERE had an audience of the King at Buckingham Palace on May 24th, upon relinquishing his appointment as Secretary of State for the Royal Air Force.



Aeroplanes from Overseas.

A PLEASING ceremony at the annual meeting of the Overseas Club on May 24th was the handing over to Sir William Weir, the Secretary of State for the Royal Air Force, of a cheque for £13,000 representing the cost of eight aeroplanes, the gift of the members of the Overseas Club and the Patriotic League, the formal presentation being made by Mr. Hewins, M.P., Under-Secretary for the Colonies.

Sir William Weir said he accepted the gift with the greatest pleasure and gratitude on behalf of the Government and the Royal Air Force. He hoped and believed the Empire had every reason to be proud of the new force. When he spoke of pride in the Air Force he referred particularly to the personnel, because, given the finest machines and equipment and the most efficient administration and organisation, the final issue in the air was largely individualistic to the pilot and the observer. To them and to the work they performed no tribute was too great.

Turning to the work which the Air Force was doing for the country at the Front, Sir William Weir said that the contributions of our fellow-countrymen across the seas towards the success of our fighting Air Force was as great as, if not greater than, in any other field of warfare, and it had won his full appreciation. As Secretary of State for the Air Force, he desired to express it at the very first opportunity that was afforded him. Without being invidious, he wished to refer to the work done by the Australian Flying Corps, and to the very large, enthusiastic and courageous quota contributed by Canada. The development of the aerial arm could best be realised by casting their thoughts back to the early days of the war, when the pioneer force of four small squadrons left our shores. In those days the sole function assigned to it was the work of reconnaissance; and where tens were then numbered, hundreds were now counted. Every day accounts could be read in the papers showing the wide scope of the duties filled by the force. To the duties of reconnaissance originally undertaken there had been added, in succession, artillery observation, offensive and defensive, photography, the bombing of communications and billets, offensive attacks by low-flying aeroplanes on infantry, in action and on the march, and, lastly, long-distance bombing operations carried on by the Royal Air Force, not only in the blackness of night, but in the full splendour of the day. It was not his intention to advertise the achievements of the Air Force, or to boast of its progress, or to make forecasts of its future successes. That would not be in accordance with the spirit of the Force, as he understood it, for, young as it was, its crowded life had already created a noble tradition and spirit of its own. He was content to leave the public to

judge of its achievements from the official records day by day in the Press. The enemy's judgment would be still more accurate, as it would be based on actual experience. His policy and that of his colleagues on the Air Council was a comparatively simple one. Whatever the Air Force had done in the past, and was doing now in the face of the enemy, every effort and every energy would be directed to further development and acceleration in the many fields of aerial activity which could effectually contribute to the successful issue of the great cause in which we were fighting.

Italian Wins French Honour.

GENERAL BONGIOVANNI, the head of the Italian Aviation Department, records in the *Excelsior* some of the exploits of the Italian Caproni machines on the Western front, mentioning the fact that seven Italian aviators have already won the Croix de Guerre with palms. He declares that considerable progress has been made of late in the Italian aircraft industry.

Richthofen's Successor Disabled.

SOME further details have now been published in Germany regarding Lieut. Bongartz, who, after the death of Richthofen, became the German "ace of aces" with 36 victories. A letter from a German aviator to the *Zoppot Zeitung* gives the following particulars about the accident to Bongartz, which recently ended his career as an aviator:—

"This afternoon a Fokker three-seater was brought down near us and overturned in landing. From underneath the machine an aviator was brought out covered with blood and with an eye coming out of its socket. A British aviator had hit him full in the face in an aerial fight. His machine was completely smashed and bespattered with blood. An injection of morphine was given him, and he is now resting quietly."

French Seaplane v. U. Boat.

It appears according to reports from Cartagena that the German submarine U. 39, which was towed there by another submarine and has now been interned, had been placed *hors de combat* by a French seaplane on duty in the Straits of Gibraltar. The seaplane opened fire and dropped several bombs which scored hits. U. 39 immediately submerged, and a little later was able, though with difficulty, to come to the surface, where it drifted about until met by the submarine which towed it into Cartagena.

Major Lufbery Avenged.

A FRENCH pilot is said to have brought down the German aeroplane whose guns killed Major Lufbery, the American "ace." The French aviator chased this machine for a distance of 25 miles before being able to destroy it.

The British Air Service

"PER ARDUA AD ASTRA"

The Royal Air Force.

London Gazette Supplement, May 21st.

The following temporary appointments are made at the Air Ministry:—
Staff Officer, 1st Class.—Lt.-Col. G. F. Pretymann, D.S.O., vice Major (Temp. Lt.-Col.) P. C. Maltby, D.S.O.; May 1st.

Staff Officers, 2nd Class.—And to be temp. Majors whilst so employed: Lieut. (Temp. Capt.) F. C. Buck; April 25th. Capt. P. le C. Gribblet; May 4th.

Staff Officers, 4th Class.—C. S. Downey (Temp. Lieut. A.O.D.), and is granted a temp. comm. as Lieut.; April 12th. Lieut. G. Purvis-Russell-Balfour-Kinnear; April 20th.

The following temp. appointments are made:—

Brigadier Commander.—Lieut.-Col. (Temp. Major-Gen.) C. A. H. Longcroft, D.S.O., and to be Temp. Brig.-Gen. while so employed; April 29th.

Staff Officers, 1st Class.—And to be temp. Lieut.-Cols. whilst so employed: Lieut. (Temp. Capt.) M. Nicholson; April 7th. Capt. A. J. Child, M.C.; May 15th.

Staff Officers, 2nd Class.—Major R. Money; April 7th.

Flying Branch.

Major C. H. Butler, D.S.O., D.S.C., and to be Temp. Lieut.-Col. while employed as Lieut.-Col. (Flying), seniority April 17th; May 8th.

To be Temp. Majors while employed as Majors (Flying): Capt. E. J. L. W. Gilchrist, M.C., from a special appointment graded as Squadron Commander; Capt. E. P. Plenty, whilst specially employed; May 6th. Capt. J. O. Andrews, D.S.O., M.C., Lieut. (Temp. Capt.) R. M. Everett, Capt. C. E. H. C. Macpherson; May 7th. Lieut. (Temp. Capt.) F. G. Andrae; May 13th.

Lieuts. to be Temp. Captains while employed as Captains (Flying): H. S. Goodlife; April 10th. A. L. Cuffe; April 29th. R. L. Crofton; April 30th. F. S. Wilkins; May 3rd. F. T. Bright; May 5th. G. B. S. McBain; May 6th. (Hon. Capt.) R. R. Thornely, D.S.C.; May 7th. A. C. Atkey (Temp. Capt.) G. G. Hubbard; May 10th.

Lieuts. (K.B.) to be Lieuts. (Flying): T. C. Annan; April 8th. C. W. Hawker, M.C.; G. E. B. Pottinger; April 24th. C. K. Medlen; April 29th. N. K. Brooks; May 4th.

Lieut. (Temp. Capt.) G. A. Cox reverts to Lieut. (Flying) at his own request and relinquishes temp. rank of Capt.; May 3rd.

2nd Lieuts. (Admin.) to be 2nd Lieuts. (A. and S.): G. P. W. Chandler, R. Colloby, A. J. Garside, G. W. Graham, W. S. Jenkins, T. H. Mercer, J. R. Noble, J. H. Parry, W. V. Thomas, W. G. Upton; April 1st. G. P. Addie, C. J. Allen, W. A. Armstrong, Wm. Campbell, C. F. Cogswell, F. Davidson, D. P. Laird, C. E. Metcalf, S. M. Robins, D. Rose, G. D. V. Russell, E. A. Seymour, L. Walsh, G. D. Wigley; April 2nd. J. Aitkin, H. P. Bell, R. R. Bourner, W. J. Burns, H. P. Crabb, C. J. Craft, C. J. Lewin, M. S. Lewin, W. T. Morrison, C. Oldfield, C. J. Rae; April 3rd. J. F. Higgins, C. G. Holmes, G. M. G. Sloan, R. Turner; April 4th. J. J. Birkenshaw, R. J. Brothers, J. Chesters, F. W. Ferguson, J. H. V. Latham, S. R. Norcott, M. de V. Summers, S. T. Tipper, A. G. B. Whitaker, F. C. Wilton; April 5th. H. G. Goddard, M. MacLean, R. S. Walter, L. A. West; April 6th. C. H. Atkinson, A. Haines, H. L. Wood; April 7th. F. A. Black, E. H. Bullen, G. F. Patch; April 8th.

The following are granted temp. comms. as 2nd Lieuts. (A. and S.): W. B. Clarke, M.C. (2nd Lieut., R.G.A.), W. A. Coryton (Lieut., Rif. Brig., S.R.) and to be Hon. Lieut.; April 1st. F. S. Greatwood (Temp. 2nd Lieut., attd. R. Suss. R.), C. B. Hayes, M.C. (Temp. Lieut.), R.E., and to be Hon. Lieut. T. M. Wilkes, M.C. (Capt. N.Z. Rif. Brig.), and to be Hon. Capt.; April 2nd. F. G. Black (Lieut. C. Ont. R., C.E.F.), and to be Hon. Lieut., F. S. Morley (Temp. 2nd Lieut., attd. W. Yorks R.), H. S. Stidson (Lieut., Sask. R., C.E.F.), and to be Hon. Lieut.; April 3rd. C. F. Brown (Temp. 2nd Lieut., attd. Durh. L.I.), R. Jones, M.C. (Lieut., Man. E., S.R.) and to be Hon. Lieut., R. Michaelis, (Temp. Lieut. attd. L'pool R.), and to be Hon. Lieut., J. S. Shaw (Lieut., R. W. Fus., T.F.), and to be Hon. Lieut.; April 5th. M. H. Edmunds; May 10th.

The following are granted temp. comms. as 2nd Lieuts. (Observer Officers): L. E. Glover, D. H. Tachauer; May 11th.

G. W. McA. Patterson (Hon. Lieut. in Army), is granted a temp. comm. as 2nd Lieut. (Kite Balloon Officer); May 20th.

The following Cadets are granted temp. comms. as 2nd Lieuts. (Kite Balloon) (substituted for notification in *Gazette* of May 3rd): E. J. A. Prosser, C. E. Taylor, W. Waddingham; April 3rd. C. H. Allen, E. S. Bale, H. C. S. Drake, J. S. Houston, W. C. Ingleby, A. A. Jackson, L. W. Killen, L. T. Lawrence, H. W. T. Lewis, P. G. Maclean, J. McCormack, E. P. Nickless, J. L. Ure, W. E. G. Wallace, G. Wayman, A. L. Wright; April 8th. K. R. Bennis, W. R. H. Gateshill, H. D. Giblett, W. G. Hines, H. G. Johnston, C. G. Martin, J. T. McDougall, A. L. Muir, H. Plackett, G. R. Robinson, C. J. Sear, G. C. Shakespeare, W. G. Smith, K. M. Stewart, K. L. Vernon, S. T. Westcott; April 15th.

The following Cadets are granted temp. comms. as 2nd Lieuts. (A. and S.). (Substituted for notification in *Gazette* of May 7th): A. H. Ashton, G. W. Astell, H. V. David, C. D. Davis, P. T. Grant, J. J. Hampton, V. S. G. Hawkins, W. Riley, A. S. Underhill; April 17th.

The following Cadets are granted temp. comms. as 2nd Lieuts. (Observer Officers). (Substituted for notification in *Gazette* of May 7th): C. Donald, H. R. Whitehead, E. G. Bugg, F. F. Schorn, D. L. Gould, C. Brooke, D. McN. Livingstone, F. D. McClinton, W. Bartley; April 23rd.

The following Cadets are granted temp. comms. as 2nd Lieut. (Kite Balloon). (Substituted for notification in *Gazette* of May 7th): R. M. Freshwater, P. J. O'Brien; April 12th. A. H. Allardyce, W. Blackhurst, W. J. Bocking, S. R. Bolton, T. Fairley, W. Knight, E. Simpson, E. T. Stead; April 29th. F. Butler, R. Davies, G. Harrison, J. N. Holman, W. E. Jones, A. Low, F. J. W. Miles, J. L. Muir, R. P. Rodick, H. L. Shearer, G. K. Smith, F. Taylor, D. A. Watson; May 6th.

The following Lieuts. relinquish their comms. on account of ill-health contracted on active service, and are granted the hon. rank of Lieut.: J. McN. Campbell, R. G. Fraser, S. C. Maytem, R. A. Pendry, J. D. E. Troop; May 22nd. Lieut. H. Stroud relinquishes his comm. on account of ill-health caused by wounds, and is granted the hon. rank of Lieut.; May 22nd.

The following relinquish their comms. on account of ill-health contracted on active service: Lieut. D. L. Macauley (Lieut., Can. Local Forces), Lieut. D. Mitchell (Lieut., Sco. Rif., S.R.); May 22nd.

The following Lieuts. resign their comms. to resume their medical studies, and are granted the hon. rank of Lieut.: G. D. Fleming, G. M. Lewis; May 22nd.

The initials of Major T. F. Rutledge, M.C., are as now described, and not as in the *Gazette* of April 30th.

Administrative Branch.

A. A. E. Robinson (Staff Paymr., R.N.) is granted a temp. comm. as Major; April 22nd.

To be Temp. Majors whilst so employed as Admin. Majors: Lieut. (Temp. Capt.) W. B. Cushion; May 6th. Lieut. (Temp. Capt.) S. A. Laird; May 10th. H. de B. Garfit (Temp. Capt. in Army) is granted a temp. comm. as Capt.; May 11th.

T. Parker-Jervis (Lieut., Gren. Gds.) is granted a temp. comm. as Lieut. and to be Temp. Capt. whilst employed as Admin. Capt.; April 1st.

To be Temp. Lieuts. whilst employed as Admin. Lieuts.: E. G. Brett, 2nd Lieut., Tank Corps, and is granted a temp. comm. as 2nd Lieut.; April 1st. J. F. Kerr (2nd Lieut., Gen. List New Armies), and is granted a temp. comm. as 2nd Lieut.; April 11th. 2nd Lieut. R. G. Fussell, 2nd Lieut. J. H. Lytle; April 26th. C. W. Banks (Temp. Capt. Gen. List, New Armies), and is granted a temp. comm. as Lieut. (Hon. Capt.); E. W. Bassil (Lieut.), Sussex Yeos., T.F.), and is granted a temp. comm. as Lieut.; May 8th. M. F. T. Cleaver, M.C. (Lieut. R.F.A.) S.R., and is granted a temp. comm. as Lieut., 2nd Lieut. W. I. Prothero; May 13th.

The following are granted temp. comms. as 2nd Lieuts. (Admin.): G. H. Cabutt (Midshipman, R.N.); April 1st. E. H. Cree; April 27th. A. B. Cocke; May 14th. R. J. Berry, L. R. Ellwood (Hon. Lieut. in Army), A. R. Fulton, H. S. North, S. J. Stagg, S. C. McCully; May 20th.

The following are granted temp. comms. as 2nd Lieuts.: U. B. Gilbert (Lieut., R.G.A., S.R.), and to be Hon. Lieut., S. H. Alston (Capt., R. W. Kent R., T.F.), and to be Hon. Capt. J. Graham (Q.M. and Hon. Capt., Scots. Rif.), and to be Hon. Capt.; W. Boning (Lieut., Norf. R., T.F.), and to be Hon. Lieut., E. R. Brydges (Lieut., Lab. Corps), and to be Hon. Lieut., T. A. Dick (Lieut., R. Suss. R., T.F.), and to be Hon. Lieut., H. Foxwell (Lieut., Fort Garry Horse, C.E.F.), and to be Hon. Lieut., T. A. M. Gardiner (Lieut., Midd'x. R., S.R.), and to be Hon. Lieut.; A. W. Hughes (T. and A. Lieut., R.F.A.), and to be Hon. Lieut., H. Bridgewater (2nd Lieut., R.F.A., T.F.), H. Clarke (2nd Lieut., Norf. R.), C. E. Knight (Lieut., E. Kent R., T.F.), and to be Hon. Lieut., H. G. Lynn (Temp. 2nd Lieut., Lab. Corps); April 4th. S. Waring (Lieut., Leic. R., and to be Hon. Lieut., M. C. Caley (Lieut., Norf. R., T.F.), and to be Hon. Lieut., J. W. Sawyer (Lieut., E. Yorks R., S.R.) and to be Hon. Lieut., F. Avison (Lieut., Lancs. R., T.F.), and to be Hon. Lieut., G. P. Browne (Temp. 2nd Lieut., Norf. R.); M. R. Williams (T. 2nd Lieut., S. A. Lab. Corps); A. J. Coxon (T. 2nd Lieut., Lab. Corps); April 25th. 2nd Lieut. A. J. Miller; April 26th.

A. J. Burge is granted a temp. comm. as 2nd Lieut.; May 20th. W. H. G. Maton, M.B.E. (Qrnr. and Hon. Capt., R.A.), is granted a temp. comm. as Capt.; April 24th.

The following relinquish their comms. on ceasing to be employed: Lieut. E. Edwards, Lieut. (Temp. Capt.) H. E. Pooley; April 18th.

The following 2nd Lieuts. relinquish their comms. on account of ill-health contracted on active service, and are granted the hon. rank of 2nd Lieuts.: L. W. Bristo, E. M. Cook, J. M. Cullen, A. G. Knight H. A. E. Moulder, D. A. E. S. Palmer-Stone, H. Pickford; May 22nd.

2nd Lieut. W. R. Gemmill relinquishes his comms. on account of ill-health, and is granted the hon. rank of 2nd Lieut.; May 22nd.

2nd Lieut. R. C. Cleland-Hollamby (Temp. 2nd Lieut., R. W. Kent R., attd.) relinquishes his commission on account of ill-health; May 22nd.

2nd Lieut. H. Walsh (2nd Lieut., R. Suss. R.) relinquishes his comm. on account of ill-health contracted on active service; May 22nd.

The following 2nd Lieuts. resign their comms.: F. M. Magenais, J. S. McCalman; May 22nd.

Technical Branch.

Capt. (Temp. Major) W. Wright to be Temp. Lieut.-Col. while employed as Lieut.-Col. (Tech.); May 1st.

Capt. T. Worswick to be Temp. Major while employed as Major (Tech.); April 19th.

Capt. S. A. Currin, from S.O., to be Capt. (Tech.); April 1st (and relinquishes appointment of D.A.D.).

To be Temp. Capts. while employed as Capts. (Tech.): Lieut. W. H. Hoffert (substituted for notification in *Gazette*, May 7th), Lieut. W. Yonge; April 1st. J. Young (from Admin. Capt.); April 29th.

To be Temp. Lieuts. while employed as Lieuts. (Tech.): J. H. Jennings (from A. and S. Lieut.); April 1st. T. R. Mayhew (from O. Lieut.); April 7th. 2nd Lieut. D. H. Moore; May 9th.

The following is granted a temp. comm. as 2nd Lieut. (Tech.): H. G. Wheeler; May 14th.

Capt. L. H. M. Bennett relinquishes his comm. on ceasing to be employed, and is granted hon. rank of Cap.; May 22nd.

Lieut. A. E. S. Story relinquishes his comm. on account of ill-health contracted on active service, and is granted hon. rank of Lieut.; May 22nd.

2nd Lieut. R. P. Donaldson relinquishes his comm. on account of ill-health and is granted hon. rank of Lieut.; May 22nd.

2nd Lieut. C. W. Gigg resigns his comm.; May 22nd.

Medical Branch.

A. A. Bisset is granted a temp. comm. as Capt.; April 12th.

G. H. Warner is granted a temp. comm. as Lieut.; May 20th.

Memoranda.

Lieut.-Col. R. G. Talbot to be graded for purposes of pay as Staff Officer, 1st class, while employed as Commandant; April 26th.

W. MacLanachan, late Lieut., R.A.F., is granted hon. rank of Lieut.; May 22nd.

P. J. Webb, late 2nd Lieut., is granted hon. rank of 2nd Lieut.; April 24th. 2nd Lieut. R. F. Ellis (2nd Lieut., Serv. Bn., R.W. Fus.), relinquishes his comm. on account of ill-health contracted on active service; May 22nd.

The notice in *Gazette* of May 10th does not include Warrant Officer Schoolmasters.

London Gazette, May 24th.

The following temporary appointments are made; April 1st:—
Deputy Director.—Maj. (Temp. Lieut.-Colonel) A. D. Cunningham, and to be Temp. Col. while so employed.

Staff Officers, 1st Class.—And to be Temp. Lieut.-Colonels whilst so employed: Capt. (Temp. Maj.) F. W. Lucas, Capt. (Temp. Maj.) W. L. Marsh.

Staff Officers, 2nd Class.—And to be Temp. Majors while so employed, if not already holding that rank:—Capt. (Temp. Maj.) S. Flower, Lieut. (Hon. Capt.) S. Nixon, Lieut. (Temp. Capt.) J. E. M. Pritchard, Capt. G. Whale, Maj. F. C. Williams.

Staff Officers, 3rd Class.—And to be Temp. Capts. while so employed, if not already holding that rank:—Capt. J. H. D. M. Campbell, Capt. P. L. R. Fraser, Lieut. (Temp. Capt.) T. E. Grant, Lieut. (Temp. Capt.) D. R. Parry-Jones, Lieut. (Temp. Capt.) J. A. C. Sumner, Lieut. (Temp. Capt.) J. E. Wain.

Staff Officer, 4th Class.—Capt. E. E. W. Butt.

Flying Branch.

Lieuts. to be Temp. Capts. while employed as Capts. (Flying):—H. Haycock, V. D. Siddons, A. E. L. Skinner; May 3rd. A. Clayton; May 6th. J. Todd; May 7th. P. J. Clayton; May 8th. C. E. Williamson-Jones; May 13th. 2nd Lieuts. (Admin.) to be 2nd Lieuts. (A. and S.):—J. G. Fleet, P. S. Gaster, C. R. R. Horton; April 15th. A. Chettle, A. E. Goodwin, E. E. A. Mills, R. Naylor; April 19th. J. H. Lenihan, D. F. McColl, W. M. Tait, R. F. Caspareuthus, G. G. Matthews, H. E. Cardwell, D. McCarter, N. Wilson, J. McDonald.

W. R. Pearson, G. Wignall, R. D. Hambrook, H. R. Hughes, F. J. Young, T. T. Warriner, J. S. Clark, J. H. Grahame, G. H. B. Smith, G. R. Wells; April 20th, A. E. Needham, E. V. Kennedy, C. R. MacNamara, J. B. Erskine, F. G. Goodes, F. T. Arnold, F. W. Scriver, G. T. Richardson; April 21st. A. J. Willox, E. Hall, J. Morton, S. Brierley, J. G. McDonald, G. Exley, H. K. Scrivener, S. E. Parson, P. H. Fowler, D. U. Thomas, R. C. Benson, H. Buckley, P. J. Cunningham, I. Holliday, J. McAuley, A. R. Melbourne, J. Whattam, R. C. Wickett, A. Wroot, J. Gannon, R. C. S. Hall, J. O. Smith, J. A. L. Champneys, A. Hindley, P. Boulton, J. B. Coutts, J. E. H. Littlewood, G. E. Richmond, F. Neale, J. G. Symons; April 22nd. K. F. Attwater, H. Oates, S. T. H. Roberts, F. E. Whitelock, F. C. P. Roberts, G. F. Holford, A. Duncan, J. M. Murray, H. C. Hagamen, A. D. Watson, C. Darbyshire, R. A. D. Jones, A. C. Masters, J. E. Walker, C. D. Clark, F. Shepherd, J. C. Fyfe, J. H. Guest; April 23rd. J. F. P. Kirsten, G. Travers, J. Morton, O. L. Frampton, C. F. Johnson, R. A. Boxhall, J. W. Marshall, C. Parker, C. E. Robinson, R. P. Smilie, J. M. Dunlop, A. W. Kite, G. Pickup, J. H. Dickson, E. Holder, K. S. Eagles; April 24th.

The following are granted temporary commissions as 2nd Lieuts. (A. and S.):—R. Walsley (Temp. 2nd Lieut., Manch. R.); April 5th. E. Littlejohn (2nd Lieut., Norf. R.); April 10th. N. H. MacNeill, M.C. (Temp. Lieut., High. L.I.), and to be Hon. Lieut.; A. MacFarlane (Temp. 2nd Lieut., attd. R. Highrs.); April 19th. C. R. Grace (Lieut., Lovat's Scouts Yeo., T.F.) and to be Hon. Lieut.; H. C. Beeston (Lieut., Essex R., T.F.), and to be Hon. Lieut.; H. E. A. Reynolds (Temp. 2nd Lieut., attd. Suff. R.); S. N. Hill (Temp. 2nd Lieut., attd. Midd'x R.); C. E. F. Arthur (Temp. 2nd Lieut., attd. R. Fus.); A. C. Reeman (2nd Lieut., R.F.A., S.R.); April 20th. G. W. Evans (2nd Lieut., R.W. Fus., T.F.); B. E. Harmer (2nd Lieut., Suff. R., T.F.); April 21st. E. C. Crosse (Temp. Lieut., Norf. R.), and to be Hon. Lieut.; W. M. Dufford (Lieut., Manitoba R., C.E.F.), and to be Hon. Lieut.; J. Douglas (Temp. 2nd Lieut., R.G.A.); M. Adam (2nd Lieut., R. Sco. Fus., T.F.); J. G. Ward (Temp. 2nd Lieut., attd. Lanc. Fus.); J. H. Nicholass (2nd Lieut., Bedf. R., T.F.); M. Forsyth (2nd Lieut., R.G.A., S.R.); B. A. Bird (Temp. 2nd Lieut., attd. K.R.R.C.); P. C. Saxby (2nd Lieut., R.W. Kent R., T.F.); L. W. Strugnell (2nd Lieut., attd. Midd'x R.); April 22nd. J. C. Alderton (Temp. Lieut., A.S.C.) and to be Hon. Lieut.; H. T. Creighton (Lieut., E. Ont. R., C.E.F.), and to be Hon. Lieut.; K. M. Walker (2nd Lieut., Wilts. R., S.R.); H. C. Kibby (2nd Lieut., Midd'x R., T.F.); P. B. Spivey (Temp. 2nd Lieut., attd. Midd'x R.), April 23rd. R. J. Thompson (2nd Lieut., Gen. List); F. J. Haney, M.C. (Temp. and Actg. Capt., R.F.A.), and to be Hon. Capt.; A. H. Belliveau (Lieut., Can. For. Corps), and to be Hon. Lieut.; T. J. L. Ryan (Lieut., C. Ont. R., C.E.F.), and to be Hon. Lieut.; R. Esterbrook (Lieut., Lond. R., T.F.), and to be Hon. Lieut.; E. I. Dexter (Temp. Lieut., attd. North'd Fus.), and to be Hon. Lieut.; C. M. Sankey, M.C. (2nd Lieut., E. Kent R.); W. Taylor (Temp. 2nd Lieut., attd. L'pool R.); J. H. Smith (2nd Lieut., Midd'x R., T.F.); April 24th.

Cadet W. N. Matthews is granted a temp. commn. as 2nd Lieut. (Observer Officer); April 23rd.

Lieut. H. J. Scudamore relinquishes his commission on account of ill-health caused by wounds; April 10th.

Lieut. W. Gray relinquishes his commission on account of ill-health contracted on active service; April 11th.

The following Lieuts. relinquish their commissions on account of ill-health contracted on active service, and are granted the hon. rank of Lieut.—A. A. Lessard, J. McDougall; May 25th.

Lieut. A. D. Purvis relinquishes his commission on account of ill-health, and is granted the hon. rank of Lieut.; May 25th.

Lieut. A. N. Mapstone relinquishes his commission on account of ill-health caused by wounds, and is granted the hon. rank of Lieut.; May 25th.

Administrative Branch.

The following are granted temp. commissions as 2nd Lieuts., and to be Hon. Lieuts.:—H. J. Barnham (T. Qrmr. and Hon. Lieut., Trg. Res.); April 25th. A. J. MacNab, M.C. (Lieut., Arg. and Suth'd Highrs., T.F.); April 27th. C. E. Cox, M.C. (Lieut., Midd'x R., T.F.), M. A. Robinson (Lieut., K.R.R.C., S.R.); May 10th.

Lieut. (Temp. Capt.) A. N. C. Macklin resigns his commission; April 10th.

Lieut. (Temp. Capt.) C. E. Morgan relinquishes his commission on account of ill-health contracted on active service, and is granted the hon. rank of Lieut.; May 25th.

2nd Lieut. H. A. Lyon relinquishes his commission on account of ill-health, and is granted the hon. rank of 2nd Lieut.; May 25th.

2nd Lieut. H. C. Appleby relinquishes his commission on account of ill-health, and is granted the hon. rank of 2nd Lieut.; May 25th.

The following relinquish their commissions on account of ill-health:—Maj. Lord R. E. Innes-Ker (Maj., Jr. Gds., S.R.), Lieut. (Temp. Capt.) G. Bell, 2nd Lieut. H. C. Tully; May 25th.

2nd Lieut. G. F. Atkinson relinquishes his commission; May 25th.

2nd Lieut. S. A. Davis resigns his commission; May 25th.

Technical Branch.

To be Temp. Lieut.-Colonels while employed as Lieut.-Colonels (Tech.):—Capt. (Temp. Maj.) J. G. Bayes, Capt. J. D. Blyth, Lieut. (Temp. Capt.) L. B. Cook, Lieut. (Temp. Capt.) W. W. Farthing, Capt. (Temp. Maj.) W. J. Fernie; May 10th.

Lieut. J. Clinkskill to be Temp. Capt. while employed as Capt. (Tech.); April 23rd.

2nd Lieuts. (Admin.) to be 2nd Lieuts. (Tech.):—W. A. Payne; April 1st. A. Dunderdale; April 6th. D. A. Fowler, E. R. Wood; April 20th. E. M. McCormack; April 22nd. R. M. Adam; April 25th. H. N. Munro; April 27th. J. R. C. Hamilton, F. W. Martyn, H. P. Greenhill, C. Henderson, J. B. Martin, N. W. B. Bovey, J. N. Eastcott, W. T. Sharp, W. K. Yarnold; April 28th. B. Thelenburg; May 1st.

Lieuts. (Flying) to be 2nd Lieuts. (Tech.):—E. S. Dowdall, and to be Hon. Lieut.; April 1st. R. S. Haward, and to be Hon. Lieut.; April 4th.

The following are granted temp. commissions as 2nd Lieuts. (Tech.):—G. le M. Mander (Temp. Lieut., Gen. List), and to be Hon. Lieut. A. S. Walker (Lieut., N. Lanc. R., T.F.), and to be Hon. Lieut.; April 1st. G. M. Bell (2nd Lieut., Norf. R., S.R.); April 17th. B. F. Harrison (2nd Lieut., R. Suss. R., T.F.), E. H. Walter (Temp. Capt., R.F.A.), and to be Hon. Capt.; J. R. Cassidy (Temp. Capt., A.S.C.), and to be Hon. Capt.; M. Proctor-Gregg (Lieut., L. N. Lanc. S.R.), and to be Hon. Lieut.; F. P. Wills (Lieut., Yorks L.I., T.F.), and to be Hon. Lieut.; A. Dingwall (Temp. Lieut., High. L.I.), and to be Hon. Lieut.; R. Drayton, M.C. (Lieut., Dorset R. S.R.), and to be Hon. Lieut.; B. Hesketh (Temp. Lieut., R.E.), and to be Hon. Lieut.; J. B. MacGill (Lieut., Lond. R., T.F.), and to be Hon. Lieut.; A. J. Newling (Lieut., Lond. R., T.F.), and to be Hon. Lieut.; R. B. Stewart (2nd Lieut., R.F.A., S.R.), C. L. Underwood (2nd Lieut., R.G.A., S.R.), T. J. Fazackerly (Temp. 2nd Lieut., R. W. Fus., F. Clarke (2nd Lieut., Res. R. of Cav.), H. C. Baker (2nd Lieut., R.G.A., S.R.), A. Greenwood (2nd Lieut., R.F.A., S.R.), L. Willment (Temp. 2nd Lieut., attd. Midd'x R.), G. C. Kemp (2nd Lieut., Lond. R., T.F.); April 22nd. L. H. P. Rees (Capt., R.W. Fus., S.R.), and to be Hon. Capt.; J. H. McCulloch (Temp. Capt., R.E.), and to be Hon. Capt.; G. B. Lockwood (Temp. Qrmr. and Hon. Capt., Gen. List), and to be Hon. Capt.; E. E. Hooper (Lieut., Welsh R., S.R.), and to be Hon. Lieut.; A. M. Reidy (Temp. Lieut., M.G.C.), and to be Hon. Lieut.; T. Bainbridge (Temp. 2nd Lieut., R.G.A.); April 28th. A. R. Handcock (Lieut., Surr. Yeo., T.F.), and to be Hon. Lieut.; May 1st.

Capt. E. R. Beney (Capt., Suff. R., T.F.) relinquishes his commission on account of ill-health contracted on active service; May 25th.

2nd Lieut. A. E. Walter relinquishes his commission on account of ill-health, and is granted the hon. rank of 2nd Lieut.; May 25th.

Royal Flying Corps (Military Wing).

London Gazette Supplement, May 18th.

Staff Officer, 3rd Class.—(Graded as a Staff Capt.)—The date of the appointment of Lieut. V. Buxton, Leic. R., is Oct. 22nd, 1917, and not as in the Gazette of Feb. 2nd.

Flight Commanders.—Capt. W. R. B. Gifford, Middx. R., S.R.; Jan. 8th, seniority from Aug. 25th, 1917. (Substituted for the notification in the Gazette of Feb. 15th.) Lieut. R. S. Carroll, S.R., from a Flying Officer, and to be Temp. Capt. whilst so employed; Mar. 1st.

The following cease to be graded for purposes of pay as Squadron Commanders whilst employed at a School of Special Flying:—Lieut. (Temp. Capt.) (now Temp. Maj.) E. J. L. W. Gilchrist, M.C., Lrs., S.R.; Nov. 26th, 1917. Lieut. H. H. Balfour, M.C., K.R. Rif. C., S.R.; Nov. 21st, 1917.

Flying Officers.—Temp. Lieut. A. W. Rowlands, Gen. List (since killed), from a Flying Officer (Observer); June 8th, 1917, seniority from July 10th, 1916. Temp. and Lieut. F. V. Webb, Gen. List; Jan. 28th. Temp. Lieut. R. S. Higgins, attd. Hamps. R., and to be transd. to R.F.C. Gen. List; Feb. 16th. Lieut. G. H. Foy, Canadian Exped. Force; Mar. 6th. Temp. Lieut. N. R. J. MacDonnell, Leins. R., and to be transd. to R.F.C. Gen. List; Mar. 17th. 2nd Lieut. H. E. Winch, R.F.A., S.R.; Mar. 21st. Lieut. G. Rooney, R. Ir. Fus., S.R., from a Flying Officer (Observer), seniority from June 13th, 1917; Temp. and Lieut. O. Green, attd. K.R. Rif. C., and to be transd. to R.F.C. Gen. List; Mar. 22nd. Temp. Lieut. J. Agnew, M.C., M.G.C., and to be transd. to R.F.C. Gen. List; Mar. 23rd. Lieut. F. H. Jebens, S. Lan. R. Mar. 24th. Lieut. A. M. R. Montagu, Ind. Army Res. of Off.; Lieut. R. C. Fyson, Suff. R. (T.F.), and to be secd.; Mar. 25th. Temp. Lieut. E. J. Detmold, Gen. List, from a Flying Officer (Observer); Mar. 26th, seniority from Apr. 15th, 1917.

Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—R. H. Holman; Dec. 24th, 1917. D. C. Henderson; Jan. 28th. N. C. Simpson Jan. 29th. E. R. Huston; Feb. 6th. W. C. Whitthorne; Mar. 9th. H. E. Dempsey; Mar. 11th. M. Goldsmith; Mar. 13th. L. H. Booth; Mar. 16th. W. C. Sterling; Mar. 17th. R. E. Coppinger, W. B. Sullivan, J. M. Rennie, K. F. De Long, J. T. Morgan; Mar. 18th. J. W. Murray; Mar. 19th. H. B. Latimer, G. G. Wakeman; Mar. 21st. C. Hall; Mar. 23rd. J. W. Ramsay, R. Johansson; Mar. 24th. A. T. Baker, W. N. Breingan, F. Whitburn, R. S. Brophy, B. Thurston; Mar. 25th. R. R. E. Munt, R. H. Bond; Mar. 27th.

Flying Officer (Observer).—2nd Lieut. (now Lieut.) C. R. Cuthbert, R.A., and to be secd.; Feb. 7th, seniority Nov. 13th, 1917. (Substituted for notification in Gazette of Mar. 14th.)

Equipment Officers, 2nd Class.—Temp. Lieut. B. Benson, Gen. List, from an Asst. Instr. (graded as an Equipment Offr., 2nd Cl.) at a School of Military Aeronautics; Dec. 5th, 1917. From the 3rd Cl., and to be Temp. Lieuts. while so employed.—Temp. 2nd Lieut. W. M. Arnot, Gen. List; Dec. 10th, 1917. Temp. and Lieut. R. W. L. Phillips, Gen. List; Temp. and Lieut. W. J. D. Partridge, Gen. List; Mar. 19th. Capt. M. K. Ryan, Alberta R., Can. Expde. Force; Mar. 30th.

Schools of Instruction.—School of Military Aeronautics.

Instructor (graded as an Equipment Officer, 1st Class).—Temp. Lieut. G. L. Sly, Gen. List, from an Asst. Instr. (graded as an Equipment Offr., 2nd Cl.), and to be Temp. Capt. while so employed; Mar. 23rd.

General List.—G. G. Wakeham to be Temp. 2nd Lieut. (on prob.); Mar. 18th.

London Gazette Supplement, May 21st.

Flying Officers.—Temp. 2nd Lieut. J. McBain, R. Highrs., and to be transd. to R.F.C., Gen. List; Dec. 1st, 1917. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—O. R. Perkins; Oct. 3rd, 1917. F. E. Beauchamp, C. E. Walton; Dec. 12th, 1917. J. W. Ironmonger; March 26th. A. P. Fitzgerald; March 30th.

Equipment Officer, 2nd Class.—Hon. Lieut. R. Hodge, from Temp. Qrmr., Gen. List, and the 3rd Cl., and to be Temp. Lieut., Gen. List; March 30th (substituted for the notification in the Gazette of May 3rd).

London Gazette Supplement, May 22nd.

Flying Officer (Observer).—The Christian name of Temp. 2nd Lieut. John Welby, Leic. R., is as now described, and not as in the Gazette of April 10th.

General List.—To be 2nd Lieut. (on prob.):—Cadet J. A. Downes, from R.F.C.; March 18th. T. A. Dickinson; March 23rd.

London Gazette Supplement, May 23rd.

Equipment Officer, 3rd Class.—2nd Lieut. C. W. Probets; March 1st.

London Gazette Supplement, May 24th.

Balloon Company Commander.—Graded as a Squadron Commander.—Capt. F. X. Russell, R. Muns. Fus., from a Coy. Comdr. (graded as a Flight Comdr.), and to be Temp. Maj. whilst so employed; Jan. 21st.

Equipment Officer, 3rd Class.—Temp. 2nd Lieut. (on prob.) G. H. Mansell, Gen. List, and to be confirmed in his rank; Jan. 21st.

London Gazette Supplement, May 25th.

General List.—The following to be Temp. 2nd Lieuts. (on prob.):—N. S. Macleod; March 21st. J. L. Montgomery, H. M. Pasmore, G. W. Porter; March 22nd. W. H. Doherty, R. L. Frace, O. W. From, C. W. Frasier, M. Furtney, G. C. Gage, D. H. Green, W. Hall, A. J. Hamilton, P. Harris, B. W. Hopkins, N. E. Lashbrook, S. Lovett, K. R. March, E. H. Maw, G. Mathewson, H. A. Nester, J. F. C. Oliver, G. Pascal; March 30th.

Memorandum.—Temp. Maj. A. Struben relinquishes his commission on appointment to R.A.F.; May 1st.

Supplementary to Regular Corps.—2nd Lieut. E. Holloway to be Lieut.; March 6th. 2nd Lieut. (on prob.) F. S. Briggs is confirmed in his rank.

London Gazette Supplement, May 27th.

Flight Commander.—Temp. Lieut. J. S. Dunkerley, Gen. List, from a Flying Officer, and to be Temp. Capt. while so employed; (Dec. 26th, 1917).

Flying Officer (Observer).—The surname of Lieut. J. F. Proctor, Alberta R. Can. Local Forces, is as now described, and not as in Gazette of March 8th, 1917.

Equipment Officers, 1st Class.—From the 2nd Class.—2nd Lieut. (Temp. Lieut.) F. D. Lugard, Spec. Res., and to be Temp. Capt. while so employed; (March 2nd).

2nd Class.—Temp. 2nd Lieut. E. S. H. Corbett, Gen. List, from the 3rd Class, and to be Temp. Lieut. while so employed; (March 2nd).

3rd Class.—Temp. 2nd Lieut. (on prob.) C. A. Cordeaux, Gen. List, and to be confirmed in his rank; (March 11th). Temp. 2nd Lieut. L. Barwell, A.S.C., and to be transd. to R.F.C. Gen. List; (March 30th).

Schools of Instruction.—School of Military Aeronautics.

Instructor (graded as an Equipment Officer, 1st Class).—Temp. Lieut. J. J. Gaynor, Gen. List, a Flying Officer (Observer), and to be Temp. Capt. while so employed; (Feb. 25th).

Assistant Instructors (graded as Equipment Officers, 3rd Class).—Temp. 2nd Lieut. W. Dawson, Gen. List, a Flying Officer; (Feb. 25th). Lieut. R. A. Carswell, Sco. Rif., T.F., a Flying Officer (Observer); Temp. Lieut. F. W. Thomas, R.E., a Flying Officer (Observer); (March 25th).

Squadron Commanders (graded for purposes of pay as Staff Captains).—Capt. T. C. Rapp, M.C., W. Rid. R., T.F., and to be secd.; (Feb. 22nd). Temp. Capt. H. B. de Montmorency, Bord. R., and to be transd. to R.F.C. Gen. List; (March 7th).

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British.

Italian Front.—Since May 8th we have destroyed 19 enemy aeroplanes and one observation balloon. During this period two of our aeroplanes failed to return."

War Office, May 18th.

General Headquarters, May 18th.

"On the 17th inst. the weather again favoured operations in the air, though at times visibility was poor. A large amount of work was done by our artillery with aeroplane and balloon observation. Many photographs were again taken of the enemy's back areas, and the constant bombing attacks carried out by our aeroplanes during the last four days were continued. Over 22 tons of bombs were dropped by us on Tournai, Courtrai, and Chaulnes railway stations, on several hostile aerodromes, and on billets all along the front. Hostile aircraft were not as active as on previous days, although large formations of German machines were encountered well east of the lines. Nineteen hostile aeroplanes were brought down and four others were driven down out of control. Ten of our machines are missing. On the same day over a ton of bombs were dropped by us on the railway station at Metz. Several bursts were seen on the track and on factories alongside the railway. All our machines returned."

"During the night our machines dropped 10 tons of bombs on Chaulnes, Haubourdin, Douai, and Marcoing stations, on Péronne, and targets in the neighbourhood of Bapaume. Raids were carried out also during the night on Thionville and Metz railway stations. Thirty-two heavy bombs were dropped, and several direct hits obtained. A fire was started at Thionville. One of our machines failed to return. On the 18th inst. a most successful raid was carried out by us in broad daylight on the railway stations, factories, and barracks at Cologne, in Germany. Thirty-three bombs were dropped, and bursts were seen on the railway sheds. Our bombing machines were attacked by several hostile scouts, two of which were driven down out of control. All our aeroplanes returned."

General Headquarters, May 19th.

"On the 18th inst. another fine day enabled bombing, reconnoitring, photograph, and fighting to be continued by our aeroplanes. Improved visibility made it possible to carry out slightly more work in conjunction with the artillery than could be accomplished during the past few days. The railway stations at Courtrai, Valenciennes, Aulnoye, Roulers, and Chaulnes were heavily bombed by us, and several of the enemy's aerodromes, ammunition dumps, and billets were also attacked. A total weight of over 19 tons of bombs was dropped on these targets. As on previous days, the greater part of the fighting took place well east of the lines. Twenty-one hostile machines were brought down and two others driven down out of control. Eight of our aeroplanes are missing."

"After dark our bombing machines were only able to be at work during half the night owing to a thick mist which blew in from the sea. Ten tons of bombs were dropped by them on Marcoing, Haubourdin, Douai, and Chaulnes railway stations, on billets in the neighbourhood of Bapaume and Bray, and on the Solway Works and lock gates at Zeebrugge. One of our machines failed to return."

General Headquarters, May 20th.

"Another full day's work in the air was accomplished on the 19th inst. Our balloons and aeroplanes actively co-operated with our artillery observing the fires of our batteries and locating active hostile guns. The enemy's railway stations, aerodromes, dumps and billets were again attacked by our bombing aeroplanes, which dropped over 17 tons of bombs. Severe fighting took place well to the east of the line, where our bombing machines were attacked by large hostile formations. Three German observation balloons were destroyed by us, 27 hostile machines were brought down, and three others were driven down out of control. Twelve of our aeroplanes are missing. After dark bombing was carried out vigorously both by us and by the enemy. Our machines dropped 15 tons of bombs on Chaulnes, Douai, Don and Marcoing railway stations, St. Denis Westrem aerodrome, Bray and Bapaume. One of the enemy's large bombing machines was brought down in our lines by anti-aircraft gunfire. All our machines returned. On the 20th inst. a ton of bombs was dropped on the barracks, gasworks and railway station at Landau in Germany (north-west of Karlsruhe). The railway was hit several times and two fires were started. All our machines returned."

Admiralty, May 20th.

"The recent fine weather has enabled constant air reconnaissances of Bruges and the Zeebrugge-Bruges Canal to be made and photographs to be taken. The result is to show that no change has taken place since April 23rd, and that the greater part of the enemy's submarines and torpedo craft which are based on the Flanders coast has been immobilised at Bruges since the Zeebrugge blocking operation."

General Headquarters, May 21st.

"On the 20th inst. our observation balloons and aeroplanes were again very active. Several long-distance reconnaissances were completed, many successful photographs were taken, and much observation work was done in co-operation with our artillery. During the day our bombing aeroplanes dropped a total weight of 22 tons of bombs on the enemy's railway stations, aerodromes, and billets. The enemy scout machines were chiefly employed in attacking our reconnaissance and bombing aeroplanes. In air fighting, 12 German aeroplanes were brought down out of control. One hostile machine was shot down by anti-aircraft gunfire. Two hostile observation balloons were also destroyed by us. Four of our aeroplanes are missing."

"During the night the aerodrome in the neighbourhood of Ghent, Tournai, and St. Quentin, used by the enemy's night bombing machines, were heavily attacked. A total weight of 13 tons of bombs was dropped on these targets. A further 4½ tons of bombs were dropped by us on the railway stations at Thionville, Metz, and Coblenz, on the Rhine. At about 8 a.m., on the 21st inst., 22 heavy bombs were dropped by our machines on the railway stations at Namur and Charleroi. One of our machines failed to return."

"Since the commencement of the German offensive, exactly two months ago, 1,000 German aeroplanes have been brought down or driven down out of control by us, and more than 1,000 tons of bombs have been dropped by us over the enemy's lines."

General Headquarters, May 22nd.

"Reconnaissance and bombing by our aeroplanes and artillery and photographic work by our aeroplanes and balloons were continued uninterruptedly on the 21st inst. Some 1,200 bombs were dropped by us on various targets, including four of the enemy's large aerodromes near Ghent and Tournai and billets in the neighbourhood of Armentières, Bapaume, and Bray. A good deal of fighting took place around our bombing machines. Sixteen German aeroplanes were brought down, and two others were driven down out of control. Two of the enemy's observation balloons were also destroyed. Three of our aeroplanes are missing."

"During the night both our own and the enemy's bombing aeroplanes were active. Over 12 tons of bombs were dropped by us on aerodromes used by the enemy's night-flying machines and on billets at Bray and Bapaume. All our machines returned. Two German machines were brought down by gunfire behind our lines. A further two tons of bombs were dropped by our aeroplanes on the chlorine factory at Mannheim, on the Rhine, causing three large fires, and another two tons on the railway stations at Thionville and Karthaus (just south of Trèves), in Germany. One of our machines failed to return. At

dawn on the 22nd inst. two formations set out on a long-distance raid to bomb the important railway triangle at Liège. All machines reached the objective and dropped 22 heavy bombs. Those dropped by the first formation caused three very large fires, which were still burning fiercely three-quarters of an hour later, when the second formation flew over Liège. Other machines dropped 12 heavy bombs on the railway stations at Metz. All machines returned."

General Headquarters, May 23rd.

"On the 22nd inst. artillery work, photography, and bombing were continued by our aeroplanes. Aerodromes used by the enemy's night-flying machines were again attacked, and over 18 tons of bombs were dropped on these targets and on hostile billets. In air fighting 13 German machines were brought down and two others were driven down out of control. One hostile machine was shot down in our lines by machine gun fire from the ground. Three of our aeroplanes are missing."

"After dark 11 tons of bombs were dropped by us on hostile aerodromes, the docks at Bruges, and on billets in the Somme area. Several direct hits were obtained on a train, causing it to burst into flames. In addition our machines again attacked Mannheim in Germany, and dropped 24 heavy bombs on the chlorine factory, causing two large fires. The blackened girders of the buildings gutted by the fires started by us in the factory by the bombs dropped on the preceding night were clearly visible in the moonlight. At the same time four tons of bombs were dropped on the very important electrical power station at Kreuswald (just east of Saarbrücken). A boiler house was hit by one bomb, and another bomb caused a large cloud of steam to arise from one of the buildings. All our machines returned. At about 11 a.m. on the 23rd inst. the Metz-Sablons railway station was heavily bombed by our machines. Bombs were seen to burst on the engine sheds and the railway. Hostile anti-aircraft gunfire was considerable, but all our machines returned safely."

Admiralty, May 24th.

"During the period May 20th to May 22nd, inclusive, Air Force contingents have carried out bombing operations against Zeebrugge, the Mole, seaplane base, and enemy shipping in the vicinity, and also against Thucrut and the enemy aerodrome at St. Denis Westrem. Two direct hits are reported on enemy torpedo-boat destroyers, with the result, according to photographic reconnaissance, that one destroyer has been sunk. In addition, three enemy machines have been driven down out of control. All our machines returned safely."

War Office, May 24th.

"**Palestine Front.**—On May 23rd three enemy aeroplanes were brought down by our machines, two falling in the vicinity of Nablus (Shechem) and one near Latrun (within the British lines)."

"**Salonica.**—The Naval Contingent of the Royal Air Force carried out a successful raid on Drama aerodrome on the evening of May 12th. One enemy machine was observed in flames, and two others enveloped in smoke."

"On the same day a hostile aeroplane was driven down near Livunovo (Upper Struma Valley). Two other machines were driven down west of Lake Doiran on May 15th, and one near Hudova (Vardar Valley) on May 21st."

"The aerodrome at Hudova was bombed by our machines on May 24th. All bombs were observed to burst near their objectives and obvious damage was caused to the hangars."

General Headquarters, May 24th.

"The long spell of fine weather came to an end about 11 a.m. on the 23rd inst. Before this hour several reconnaissances were carried out by our aeroplanes, and 8 tons of bombs were dropped on aerodromes in the neighbourhood of Tournai, used by the enemy's night-flying machines, and on hostile billets. Three German machines were brought down in air fighting and two others were driven down out of control. Three of our aeroplanes are missing."

"During the night, in spite of a very high wind, our machines dropped over 7 tons of bombs on billets in the neighbourhood of Péronne, Fricourt, and Bapaume, and on hutments and woods in the Somme area. All our machines returned."

"On the 24th inst. nearly a ton of bombs was dropped on the railways and factories at Hagendingen, 12 miles north of Metz. When over their objective our machines were attacked by hostile scouts, and the enemy's anti-aircraft gunfire was considerable. All our aeroplanes, however, returned safely."

General Headquarters, May 26th.

"On the 25th inst. flying was only possible during a few fine intervals. Advantage was taken of these periods to drop over 300 bombs on billets in the neighbourhood of Armentières and Merville, on an ammunition dump at Varsenaere (south-west of Bruges), and on Bruges Docks. In air fighting, eight hostile machines were brought down, and two were driven down out of control. Another German machine was shot down by machine-gun fire from the ground. None of our aeroplanes are missing. During the short period of the night in which bombing was possible, over 6 tons of bombs were dropped by us on Péronne, Bapaume, and Maricourt. All our aeroplanes returned."

General Headquarters, May 27th.

"On the 26th inst. little flying was possible till the evening, owing to low clouds and a dense mist. Four tons of bombs were dropped by us on targets in the neighbourhood of Armentières and Fricourt. Six hostile machines were brought down in air fighting. None of our aeroplanes are missing."

"On the 27th inst. Bensdorf railway station was bombed by our aeroplanes. Twenty heavy bombs were dropped, and bursts were seen on the railway sidings. Our bombing machines were heavily attacked by hostile scouts over their objectives, and one of our machines was seen to go down under control. All our other aeroplanes returned safely."

Admiralty, May 27th.

"During the period May 23rd to May 26th, inclusive, operations by Air Force contingents have been somewhat hindered by unfavourable weather conditions. Bombing operations have, however, been carried out against Mariakerke and Zeebrugge, where bombs were observed to fall close to the lock gates and canal derivation. Nearly three tons of bombs were also dropped on Bruges Docks during the night of the 22nd-23rd. All our machines returned safely."

"In home waters, during the period, numerous flights in escort, patrol, and other anti-submarine duties were carried out. Submarines were sighted and attacked, and enemy mines were located on several occasions. Our seaplanes have also carried out long reconnaissances over the North Sea."

"On May 20th, Allied aircraft made a successful bombing attack on the Austrian naval base of Cattaro. A direct hit was obtained on the barracks inhabited by submarine crews, where a fire was seen to break out."

French.

Paris, May 18th.

"Between Lassigny and Noyon two enemy aeroplanes were brought down by our anti-aircraft defences, one during the day of May 16th and the other during the night of May 16th-17th."

Paris, May 19th.

"There was increased aerial activity to the north-west of Toul and in Lorraine."

"On Friday and Saturday our pilots engaged in several fights, in the course of which 12 German aeroplanes and four captive balloons were destroyed. Twenty-three enemy machines fell seriously damaged in their own lines. In

addition three aeroplanes were brought down by our anti-aircraft defences, one by an American battery. On the same days and on the following night 44,000 kilograms (about 44 tons) of projectiles were dropped by our bombing squadrons on the stations, cantonments, and aerodromes of the enemy zone. Several fires, some explosions, and considerable damage were observed."

Salonica.—In the course of these operations (to the west of Koritza), the air service contributed brilliantly to their success."

Paris, May 20th.

Salonica.—The British Air Service successfully bombarded the enemy establishments in the region of Demirhissar."

Paris, May 21st.

"On May 19th during the daytime our chasing pilots brought down six German aeroplanes. Nine other enemy machines fell in their own lines badly damaged after fighting. On the same day and during the following night 25,000 kilograms (about 25 tons) of bombs were dropped by our bombardiers on the cantonments at Rosières en Santerre, the aviation grounds of Villeselve and Vauvillers, and the railway stations of Péronne, Nesle, Chaulnes, &c. A big fire broke out at Rosières. In addition, during the same night, some Italian machines bombarded the railway station of Montcornet and the aerodrome of Ville aux Bois, where great damage was observed."

Salonica.—Allied airmen bombarded the stations of Angista and Hadji Beljik on the Seres-Drama line, the aerodrome of Resna (to the north of Lake Prespa), and the encampments of Gransi (on the Devoli). In the course of these air fights one enemy machine was forced to descend."

Salonica.—In spite of the unfavourable weather, the Allied air squadrons bombed the depôts of Demirhissar and Ochrida."

Paris, May 23rd.

"On May 20th an enemy aeroplane was brought down in an air combat. It is confirmed that eight German machines were destroyed by our pilots, one on May 15th, another on May 16th, and six on May 19th. In addition two machines were brought down by the anti-aircraft defences on May 20th and May 21st. On May 20th and the following night our bombing squadrons dropped 17,000 kilograms of projectiles on the region of St. Quentin, Noyon, and Tergnier, the stations of Péronne, Rosières, Nesle, and the aviation grounds of Villeselve."

"Two large fires followed by explosions were observed at St. Quentin and at Nesles."

"On May 21st and the following night our aeroplanes dropped 30,000 kilograms (30 tons) of bombs on the same regions, causing numerous fires. Cantonments and stations in the region of the Ville Aulois, Hiron, Le Cateau, Aulnoye, &c., received during the same period 11,000 kilograms of explosives. Italian aviation crews took part in these expeditions."

Paris, May 24th.

Salonica.—Allied airmen bombed the aerodrome of Hudovo and the enemy encampments to the north-west of Nonte and in the region of Ochrida."

Paris, May 25th.

"During the days of May 22nd and 23rd four enemy aeroplanes and two captive balloons were driven down by our fire. It is confirmed that five more German machines were destroyed in aerial combats during May 16th, 19th and 21st."

"Between May 21st and May 23rd inclusive, our bombarding squadrons dropped 30 tons of projectiles on railway stations, cantonments, and aviation grounds in the enemy zone. Fires were observed in the railway stations of Montescourt and Hiron (south of Maubeuge), and serious damage was apparently caused in the aerodrome at Cappy."

Paris, May 26th.

Salonica.—Allied airmen dropped over 1,300 kilograms of explosives on the enemy's establishments. In the course of the air fighting on the 25th two enemy machines were forced to descend."

U.S.A.

"In the Woivre there was continued aerial activity, our machines successfully engaging the enemy in several encounters."

Paris, May 20th.

"There was reciprocal activity on the part of the aviation service of both sides. Our airmen brought down two enemy machines."

Paris, May 24th.

"It is established that our airmen shot down two hostile machines on May 21st."

Belgian.

"Lieut. Jan Olieslager brought down his sixth enemy machine, which fell in flames above Lake Blankart. Adjutant Coppens brought down a German balloon in flames. This airman has brought down one machine and four balloons in the course of the last three weeks."

Havre, May 20th.

"South of the Forest of Houthulst, Adjutant Coppens brought down a German balloon in flames. This airman has brought down four other balloons in the course of the last three weeks."

Havre, May 21st.

"Our aeroplanes and balloons lent valuable assistance in observing for our batteries."

"The enemy indulged in long-range fire, and bombs were dropped by his airmen on our cantonments in the back zone. We engaged in reprisals on similar objectives in the enemy's zone."

Havre, May 22nd.

"As a reprisal for bombardments carried out by enemy aeroplanes our airmen dropped some bombs last night on the sheds in the railway station of Zarren and on sheds at Laffinghe and Leke."

Italian.

"On May 14th a squadron of our seaplanes bombed with good results the military works at Lissa and Durazzo, causing visible conflagrations. The works at Durazzo were also bombarded on May 13th with good results by British aviators. In spite of anti-aircraft fire all machines returned undamaged to their bases. During a reconnaissance over Durazzo our airmen established the fact by means of photographs that the Austrian warship and torpedo-boat torpedoed by us on the night of December 13th are lying at the bottom of the sea, and may be considered as lost."

Rome, May 17th.

"Three enemy machines were brought down along the Middle Piave, two of which within our lines, and the third at Grave di Padadopolli."

Rome, May 19th.

"Aircraft activity was considerable along the whole front. A kite balloon and four enemy machines were brought down, two of them by British airmen."

Flax from Canada.

A MESSAGE from Ottawa states the imperative need of cultivating as large an area as possible of fibre-producing flax is being urged upon Canadian farmers, in order to make up for the cutting off of the supply from Russia. The province of Ontario, which already produces flax to the value of 2,000,000 dols. per annum, and which last year sent considerable supplies to the Irish flax mills, will, it is stated, increase

Rome, May 21st.

"Our own and British airmen brought down eight enemy aeroplanes; a ninth machine, hit by the artillery, fell in flames."

"On Saturday our seaplanes reconnoitring in the Upper Adriatic had a desperate fight with a number of enemy machines about 15 miles west of Pola. One enemy machine was brought down and one of ours had to alight on the sea after being hit. To prevent its falling into the hands of the enemy it was destroyed by the pilot, who was rescued by another of our seaplanes."

"Yesterday, in the Southern Adriatic, our seaplanes bombed simultaneously the military works at Durazzo and those at Lagosta (Dalmatia) with visibly good results. Despite intense anti-aircraft fire, all our machines returned uninjured to their bases."

Rome, May 22nd.

"The activity of our own and Allied airmen was considerable. Eight enemy machines, two of which were accounted for by anti-aircraft batteries, were brought down."

Rome, May 23rd.

"Our own and Allied airmen brought down three enemy aeroplanes and forced two others to land. The enemy aviation camp near Motta di Livenza and troops and wagon transport on the march on the Asiago Plateau were bombarded with effective results. Major Baracca has gained his 32nd victory."

"During the day of May 20th, a British air squadron bombarded the seaplane station and submarine base at Cattaro. A fire was observed in buildings near the landing-stages and in the barracks. In spite of intense anti-aircraft fire and the action of enemy machines, which gave chase, the British squadron returned undamaged to its base."

Rome, May 24th.

"Intense aerial activity; five enemy machines were brought down. The aviation camps at Feltre and Motta di Livenza were successfully bombarded."

"In the afternoon of May 22nd a reconnoitring air squadron on its way back from an important mission successfully executed on the coast of Istria was attacked by Austrian 'chasers,' but our 'chasers' having come up, the Austrian squadron made off rapidly, our machines returning unharmed."

Rome, May 25th.

"Since the 18th inst. the Royal Air Force has carried out numerous reconnaissances far behind the enemy lines and collected much useful information. Many bombs have been dropped on enemy hutments and dumps."

"In air fighting since May 18th, 24 enemy aeroplanes have been destroyed. In addition, one enemy observation balloon has been burnt. During this period we have not lost a single machine."

"British airmen bombed enemy troops in the lines of communication on the Asiago Plateau. Five machines were brought down, and a sixth forced to land."

Rome, May 26th.

"Our own and Allied planes, flying low, fired with machine-guns on and bombarded enemy troops, batteries, and billets in the Asiago basin and along the Piave."

Rome, May 27th.

"Aerial activity was partially limited by bad weather. Eight enemy aeroplanes were brought down."

German.

"Yesterday 18 enemy aeroplanes and one captive balloon were shot down. Lieut. Loewenhardt achieved his 22nd aerial victory, and Lieut. Windisch his 21st.—*Admiralty, per Wireless Press.*"

Berlin, May 17th.

"Yesterday 16 enemy aeroplanes and one captive balloon were shot down."

Berlin, May 21st.

"During the last three days 59 enemy machines and three captive balloons were brought down. Lieutenant Loewenhardt obtained his 24th and Corporal Rumeys his 20th and 21st victory in the air."

Berlin, May 22nd.

"During the night of May 20th-21st, one of our bombing squadrons destroyed extensive French munition depôts near Blargie. Lieutenant Mekloff achieved his 27th aerial victory, and Lieutenant Puetter his 23rd and 24th."

Berlin, May 23rd.

"On the Lys battlefield, three American aeroplanes, amongst others, were brought down yesterday. The enemy aerial attacks against Belgian territory which have increased in frequency of late, have inflicted heavy damage and losses on the civilian population. No military damage has been caused. By successful bomb-dropping large enemy munition depôts to the north-west of Abbeville were destroyed. Bombs were also dropped on Paris."

Berlin, May 25th.

"On May 23rd the crew of an observation aeroplane, Lieut. Eismonger and Sergt. Gund, shot down four machines out of a chain of six British one-seater battleplanes."

Austrian.

"Six aeroplanes bombed the Gulf of Cattaro naval base on the afternoon of May 11th, but claims that no loss or material damage was caused. One machine fell, and its occupants were captured uninjured."

Vienna, May 25th.

"Over 20 enemy aeroplanes dropped bombs on Feltre. One civilian was killed and eight wounded. Otherwise only slight damage was caused. Field-Pilot Temp. Officer Kiess, one of our most successful pilots, was brought down in aerial battle and was found dead."

Turkish.

"In the Aegean one of our aeroplanes attacked the enemy artillery positions in the island of Meis, and the good effects of this attack were observed. Despite the enemy's counter-action, our aeroplanes returned undamaged."

Constantinople, May 22nd.

"Our airmen attacked with success enemy camps on the sector of the Jordan west of Jericho and the Wadi-Auja."

Constantinople, May 23rd.

"There is continuous lively aerial activity."

Constantinople, May 25th.

"Our aeroplanes dropped a quantity of bombs on a rebel camp in the neighbourhood of Kerak."

Bulgarian.

"In the valley of the Vardar, there was lively aerial activity on the part of the enemy."

Sofia, May 15th.

Sofia, May 22nd.

"In the Monastir region German airmen brought down three enemy machines, which were destroyed by the fire of our artillery."

SIDE-WINDS.

FROM Mr. H. E. Latimer-Voight we learn that M. Chauviere having severed his connection with the Integral Propeller Co., Mr. and Mrs. Latimer-Voight have likewise left that company, and have now become proprietors of the Pegasus Aircraft Co., where they will continue to devote themselves to the design and manufacture of airscrews.

A PLEASING little ceremony took place the other day when the office staff and the employees of the Integral Co. met together to say farewell to Mr. and Mrs. Latimer-Voight. The office staff presented a pair of exceedingly handsome real old English cut glass vases with gold mounts and a beautiful bouquet for Mrs. Voight. The works presented Mr. Voight with a handsome pair of gold sleeve links, and to the works manager, Mr. Lancelot Saunders, a brother of Mrs. Latimer-Voight, who is also leaving the company, a meerschaum pipe. Mr. W. R. Anderson, in making the presentation, expressed the deep regret of all the factory at the departure of Mr. and Mrs. Latimer-Voight and Mr. Saunders, each of whom replied, Mr. Voight urging all to be loyal to the new management, for every machine and therefore every propeller turned out would help to end the war.

In the afternoon Mr. Voight captained the cricket team in the Munitions League Match *v.* Becks. After an exciting game the visitors won by sixteen runs. Afterwards Mr. and Mrs. Voight entertained a large party to tea, and then took them off to the Kilburn Empire, where a pleasant evening was spent.

Paris-London Aerial Post.

THE *Journal* states that two airmen, Devienne and Lorgnat, in an attempt to carry out an aerial postal service from Paris to London, left Bezons, seven and a half miles north-west of Paris, on a seaplane at 12.50, and arrived in London at 3.20 p.m.

They left again for Paris at 4.20 p.m., effecting the return journey in three hours and ten minutes.

The Wilbur Wright Memorial Lecture.

THE Wilbur Wright Memorial Lecture will be delivered in the Central Hall, Westminster, on Tuesday, June 25th, at 8 o'clock, by Dr. W. F. Durand, Chairman of the American Advisory Committee for Aeronautics, and Scientific Attaché to the American Aviation Mission in Europe. His subject will be "Some Outstanding Problems in Aeronautics."

As there is sure to be a heavy demand for tickets, those desiring to be present should make an application as early as possible to the Secretary of the Aeronautical Society, 7, Albemarle Street, Piccadilly, W. 1.

German Bombs on Hospitals.

THE Chancellor of the Exchequer, in the House of Commons on Tuesday, replying to Mr. Brookes, said: A raid was carried out on the night of May 19th and 20th against Etaples, where there are a large number of hospitals. Over 300 casualties were caused to hospital patients. A full report on the subject has been asked for, but has not yet been received.

The Raid on Cologne.

ACCORDING to the Cologne *Volkzeitung* the number of casualties in the Cologne raid were: Killed, 39; wounded, 95. Ten of the wounded are not expected to live. The Kaiser has sent to the Burgomaster of Cologne a long telegram of sympathy.

The victims of the raid were buried on Wednesday last week at the cost of the city. Many dignitaries were present. Although no attack developed, the warning was again given on May 23rd at Cologne, and the city is in a state of extreme nervous tension.

The German Chancellor on Air Raids.

A MESSAGE received in Amsterdam from Berlin says that the Imperial Chancellor has given the following answer to a question concerning protection against air attacks:—

"Perfectly sure methods of preventing air raids do not exist. In the first place comes a good anti-aircraft defence, then the menace of reprisal raids against the enemy capitals. The Army Administration is active in both directions. According to newspaper reports, serious and urgent voices were raised in the French Chamber, and especially in the Municipal Council of Paris, in favour of an agreement among the belligerents, as to the cessation of air attacks against towns outside the zone of operations. This, so far, has not led to definite proposals from the enemy side. Should this happen military quarters would first be charged with the examination of the proposal."

THE Pegasus Aircraft Co., which will now be carried on by Mr. and Mrs. Latimer-Voight, has its offices at Tottenham Street, Tooting, S.W., and the telephone call is Streatham 1242.

MESSRS. BELLING AND Co., the electric heating engineers of Derby Road, Edmonton, London, N. 18, announce that in consequence of further increases in the costs of labour and material, their list prices are now subject to an increase of 50 per cent., with the exception of their fires, which will be subject to 33½ advance.

To ensure satisfactory repetition work it is essential that jigs and fixtures, limit, gap and profile gauges and form and press tools should be quite right. This work is a speciality of the Enfield Machine and Auto Tool Co., of Chase Side, Enfield, and that their work is satisfactory is more than sufficiently testified to by the work which they have in hand for many important firms. They also undertake various other branches of engineering work, such as sheet metal work, bolts, nuts, pins, washers and aircraft fittings generally.

AMONG those firms who realised that specialisation meant success in the production of aircraft fittings, must be included the British Gold Shell Ring Co., Ltd., of Hounslow, who decided that they would specialise on shackles. Their choice was a wise one as time has shown, and those who want supplies of shackles should get in touch with the British Gold Shell Ring Co., Ltd.

An Air Raid Exhibition at Cologne.

ALTHOUGH the people of Cologne are squealing about the air raid on their precious city, they appear to take great interest in the way this development of modern warfare is being carried on. The great feature of the German War Air Fleet Exhibition—which was visited by 44,200 people on Whit Sunday and Monday—is the demonstrations of bomb-throwing. Lecturers show how bombs are thrown, and give demonstrations of their arrangement in aircraft and their liberation therefrom, while from a tower a miniature air raid is carried through, clearly showing the public the tactics of bomb attack.

German Aeroplanes in Denmark.

A GERMAN seaplane, marked B7, drifted ashore at Elsinore on May 13th, reports the *Morning Post* correspondent at Copenhagen. The machine was seen to fall on the previous day in the Sound. The dead bodies of two aviators have been found by a German trawler.

A German aeroplane has landed near Kolding, Denmark, and the occupants set the machine on fire.

The New Super-Gothas.

THE following particulars are said by Reuter's Special Correspondent with the French Army to have been given of the new giant Gotha bombing plane which the Germans are said to have employed in the last night raids on France and England. The "Giant" has a wing spread of 40 metres (131 ft.), and is driven by three motors, each of 300 h.p. It can carry nine passengers, but when on raids the crew is reduced to five or six in order to carry more bombs and petrol. Each machine carries usually about 2 tons of bombs, including one of about a ton in weight, containing 850 kilos. (about 1,912 lbs.) of explosives. Owing to the extreme difficulty of landing at night with machines of such size, it is probable there will be a high proportion of loss through accidents among the giants.

German Aviators in Sweden.

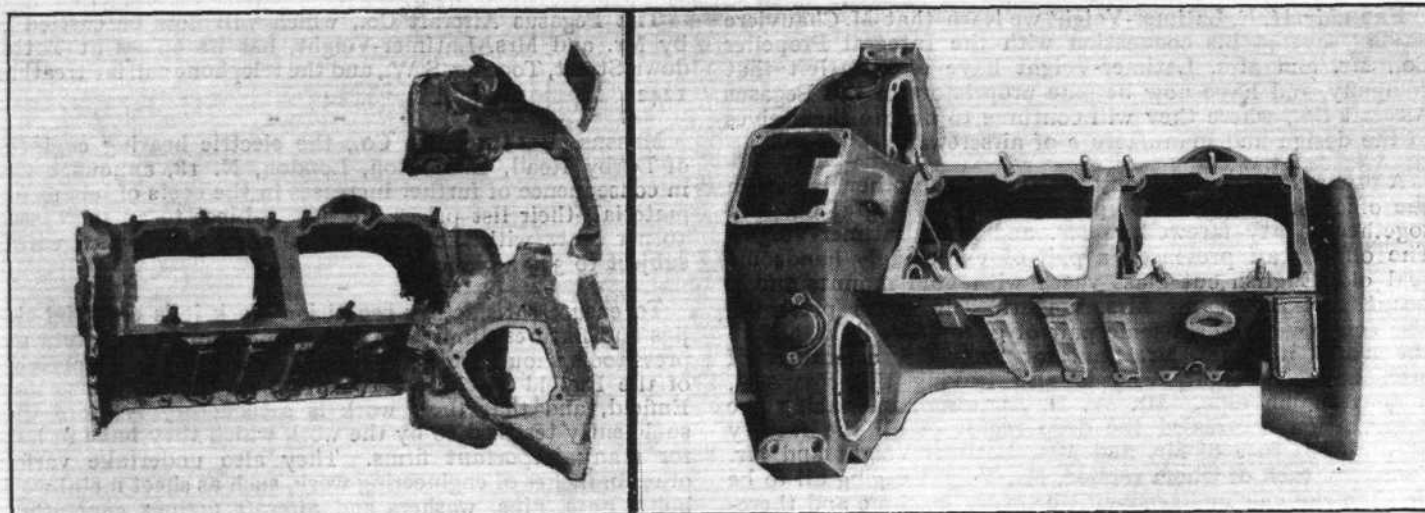
TWO German aviators landed on May 19th at Marstrand, a town in a small island in the Cattegat, and have since been interned, saying the *Morning Post* correspondent at Stockholm. They belonged to the second Wilhelmshafen squadron, and were picked up by Swedish fishermen near the Dogger Bank. They had been on an expedition to the English coast, and were compelled by lack of benzene on the return journey to descend. They were in a terrible condition physically. Their seaplane was wrecked.

Zeppelins Out Again.

THE *Ribe Stiftstidende* records that Zeppelins and aeroplanes were last week again very active in the North Sea, after having decreased their operations for a long time, principally along the west coast of Jutland.

A Zeppelin Destroyed.

A REPORT from Copenhagen on May 24th states that fishermen who have arrived at Esbjerg state that they witnessed a German Zeppelin brought down in the North Sea. The fishermen stated that the crew were saved by the men on a British destroyer.



A sample of the many jobs successfully tackled by the skilled workers of the New Welding Co. One of the photographs shows a crankcase as it reached the firm, with one or two of the pieces missing, while the other view shows the crankcase "as good as new," as returned to the owners.

UNAFFILIATED MODEL CLUBS DIARY AND REPORTS.

Club reports of chief work done are published monthly. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

The Grahame-White Model Aeroplane Club.

CONSTRUCTION has gone on apace during this month, and many machines are building, some of novel design intended to compete in the competition to be held at the end of the month, for distance, duration, altitude and efficiency. Mr. Riach has drawn up the rules, and Mr. Boudot has kindly offered to give prizes. The efficiency to be obtained by the formula:—

$$\frac{\text{Weight of machine} \times \text{distance flown}}{\text{Weight of rubber.}}$$

In the early part of the month, a considerable amount of flying was done, the twin pusher built by Mr. Mottram putting up some very good flights, the most notable of which, lasting about 40 secs., terminated in a high tree outside the aerodrome. At the same time a large hollow spar tractor of Mr. Fortescue's was on trial; it was found to require more power and a more rigid fixing of the main plane. A few days later Mr. P. J. Poultney brought out a large tractor with a wire wing. This machine was a very steady flier, and would fly head to wind until the rubber was nearly unwound, then it would turn and land down wind; average flight about half a minute duration and from 200 to 300 yards. On the same day Mr. Mottram put a neat tractor of conventional design through trials. This machine performed fairly well until it smashed its propeller; it was found to have a very fast climb. Mr. Tompkins completed a large hollow spar tractor with a double surfaced flexible trailing edge, which unfortunately crumpled up on hitting the ground, mainly owing to its delicacy of construction. A little later Mr. Mottram tried a 20-in. span tractor, weight 1½ ozs. This machine performed very well, making flights of 43 secs., at an altitude of 40 ft.

NEW COMPANIES REGISTERED.

M. L. GLOVER AND CO., LTD.—Capital £4,000, in £1 shares. Acquiring the business of manufacturers of heat-treated and otherwise finished aeroplane engine and other parts carried on by M. L. Glover at 39, High Street, Cheadle, Cheshire. First directors: M. L. Glover, and A. A. Smith.

L. R. SYNDICATE, LTD.—Capital £1,000, in 1s. shares. Objects, to work a process for rendering incombustible and/or impermeable wood, paper, cloth and other materials, to manufacture a substitute for dopeing and soap or a substitute for soap, to manufacture sealing wax and apparatus for preventing the explosion and combustion of the petrol oozing from aeroplane and other tanks, &c. Permanent directors: F. J. Lecharlier and A. A. J. Ravelli.

MAGNETO AND SPARE PART CO., LTD., 227, Broad Street, Birmingham.—Capital £1,000, in £1 shares. First directors: G. Malham and S. H. Parrott.

SADGROVE AIRCRAFT CO., LTD.—Capital £15,000, in £1 shares. First Directors: W. H. Sadgrove, W. E. Brown and J. S. Richardson.

SUNBURY AVIATION CO., LTD., 32, Charing Cross, S.W. 1.—Capital £10,000, in 9,000 preferred shares of £1 each and 20,000 deferred shares of 1s. each. First directors: H. N. Ballantyne and G. F. Hird.

PUBLICATIONS RECEIVED.

American National Advisory Committee for Aeronautics: Report No. 15. Nomenclature for Aeronautics. Washington, D.C., U.S.A.: National Advisory Committee for Aeronautics, Munsey Building.

The Red Air Fighter. By Rittmeister M. F. von Richthofen, with introduction by C. G. Grey. London: The Aeroplane and General Publishing Co., Ltd. Price 2s. 6d. net.

IMPORTS AND EXPORTS, 1917-1918.

AEROPLANES, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25th, 1912; for 1912 and 1913, see "FLIGHT" for January 17th, 1914; for 1914, see "FLIGHT" for January 15th, 1915; for 1915, see "FLIGHT" for January 13th, 1916; for 1916, see "FLIGHT" for January 11th, 1917; and for 1917, see "FLIGHT" for January 24th, 1918.

	Imports.		Exports.		Re-Exportation.	
	1917.	1918.	1917.	1918.	1917.	1918.
January...	10,842	49,402	67,033	24,765	—	—
February	9,479	51,941	26,512	13,545	6	—
March ...	11,158	47,930	58,517	11,451	—	1,000
April ...	21,141	33,342	21,151	10,815	—	—
	52,620	182,615	173,213	60,576	6	1,000

Aeronautical Patents Published.

Applied for in 1917.

The numbers in brackets are those under which the specifications will be printed and abridged, &c.

Published May 30th, 1918.

- 6,042. S. E. SAUNDERS, LTD., S. E. PORTER AND F. GOATLEY. Landing runners for aircraft. (115,260.)
- 9,021. G. H. PARKIN. Mechanical starting-gear for I.C. engines used in aeroplanes, &c. (115,326.)
- 10,193. BRITISH EMALLITE CO. AND F. TWYMAN. Measuring tension of stretched fabrics. (115,338.)

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If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages 1, li, and lii).

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and The Aircraft Engineer.

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